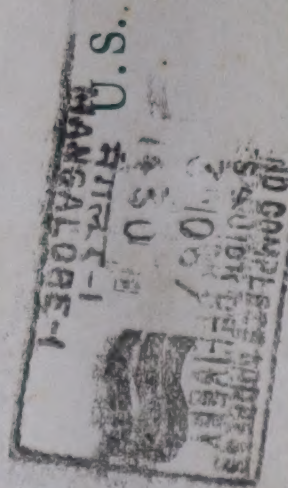


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BUREAU OF COMMERCIAL FISHERIES





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0.117 ESTER INTERCHANGE TECHNIQUE USING MOLECULAR SIEVES

Roelofsen, D. P., J. A. Hagendoorn, and H. van Bekkum (Laboratory of Organic Chemistry, Technological University, Delft, The Netherlands) *Chemistry and Industry* No. 39, 1622-1623 (September 24, 1966)

Uniformly pore-sized adsorbents, such as molecular sieves of type A, are widely used for separation purposes. However, the literature contains relatively few data on the use of molecular sieves in shifting chemical equilibria by selective adsorption of one of the products. Examples have been limited to cases in which water was to be removed from reacting mixtures.

The use of molecular sieves to shift chemical equilibria has been applied to a novel, ester interchange technique. When the authors studied the equilibrium rapidly established by alkoxide catalysis, $\text{RCO}_2\text{Me} + \text{R}'\text{OH} \rightleftharpoons \text{RCO}_2\text{R}' + \text{MeOH}$, they found that the reaction went smoothly to completion by adsorbing the methanol selectively on a suitable molecular sieve. Use of a molecular sieve type 3A allowed the reaction of any alcohol ($\text{R}'\text{OH}$). A molecular sieve type 4A worked equally well, except when ethanol was the displacing agent. In the case of ester interchange with secondary, tertiary, or branched primary alcohols, a sieve type 5A also worked well.

Benzene was used as a solvent with (1) a suspension procedure with the sieve in direct contact with the reactants, (2) a Soxhlet technique in which the methanol was adsorbed from the reflux by the molecular sieve while the nonadsorbed part of

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: M. F. Tripple

0.12 PLASTICS FOR TOMORROW'S WATER-COOLING TOWERS

Sherwood, P. W.
Modern Refrigeration 68, 475-485 (May 1965)

Plastics are gaining increasing acceptance in the construction of water-cooling towers. The major attractions are compactness, light weight, and resistance to deterioration. The main plastics for cooling-tower components are high-impact polystyrene, polyvinyl chloride, polypropylene, and high-density polyethylene. Reinforced polyesters are also used, especially in small units.

Any measure of performance must be assessed primarily in comparison with wood and galvanized steel, which are the chief materials used in cooling-tower construction. Compared with wood, plastic has a low weight/strength ratio, which offers the principal advantage of less bulk. Plastic packing offers the advantages of longer life and complete resistance to breakdown by bacterial or fungus attack. Metal towers are more compact than are wooden units and plastics give comparable compactness. Plastics offer the added advantage of being resistant to the corrosion that attacks galvanized steel. Corrosion-resistant metals are more expensive. Aluminum comes the closest to plastic construction in overall function and cost.

Plastic molding permits wide variations in the shape of the tower packing, so it is possible to design the transfer surface not only for minimum weight per unit

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ABSTRACTER: M. F. Tripple

0.30 THE DRYING OF ORGANIC SOLUTIONS CONTAINING FOOD VOLATILES

Nursten, H. E. (Procter Department of Food and Leather Science, The University, Leeds 2, England), and Anthony A. Williams
Chemistry and Industry No. 53, 2188 (December 31, 1966)

The preparation of aroma concentrates to be separated by gas chromatography and trapped for physical examination involves a solvent extraction step and these extracts must be dried before concentration. Difficulty is experienced in drying when sodium sulfate ether extracts of black-currant distillates are used, since the affinity for water of the organic layer is increased by the presence of lower alcohols. The presence of water during distillation leads to an essence contaminated with water, and causes azeotrope formation, which considerably reduces the yield of essence.

With extracts of food volatiles, the nature of the compounds present is unknown, and drying agents, other than the neutral type, cannot be used because of the risk of causing chemical changes. Magnesium perchlorate, an efficient drying agent, forms a hexahydrate with water that is very soluble in alcohols and ethers, and is a powerful oxidizing agent. Inertness is a factor favoring such drying agents as sodium sulfate, magnesium sulfate, and calcium sulfate. Sodium sulfate and magnesium sulfate are poor drying agents but they do form decahydrates, respectively, and can account for relatively large amounts of water (126 (over))

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ABSTRACTER: M. F. Tripple

0.35 EFFECT OF SYNTHETIC CHELATES ON THE AUTOXIDATION OF UNSATURATED FATTY ACID ESTERS

Jacini, Giovanni, and Enzo Fedeli (Experiment Station for Oils and Fats, Milan, Italy), and Wilbur C. Schaefer (Northern Regional Research Laboratory, ARS, U.S. Department of Agriculture, Peoria, Illinois)
Journal of Agriculture and Food Chemistry 14, No. 6, 650-653 (November-December 1966)

This study was part of a larger investigation on catalyzing and utilizing autoxidation as a means of obtaining polyfunctional derivatives of long-chain fatty acids from an unsaturated oil. The immediate concern of this study was the catalytic effect of various synthetic chelates. For this reason, other parameters were set arbitrarily as follows: oxidation was with dried air flowing at 50 liters per hour per 30 grams of substrate at 30° C. in glass apparatus. Most tests were conducted using methyl oleate as the substrate; a few employed a mixture of methyl linoleate and methyl linolenate.

It had been shown (Chalk and Smith, 1957) that chelation may have a variety of effects on the catalytic activity of metals. This study showed that catalytic ability depends on both the metal and the chelating agent.

SaEn chelates.--Because they can be easily purified, are stable, and have been extensively studied, Calvin or *SaEn* chelates (Calvin, 1946, 1952) were used first in this study. These chelates, formed by metals of the first transition series with the Schiff bases obtained from salicylaldehyde and ethylenediamine, are not

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ABSTRACTER: E. R. Weissman

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| <p>0.12</p> <p>of heat but also for minimum temperature drop. This design results in tower compactness and low power consumption by the air fan.</p> <p>Basically, packings function in two ways--as splash cooling and as film cooling. The difficulties of using wood for either type are avoided by the use of either metal or plastic grids. Either type of material can be made into much thinner slats without the total air-water exchange's being reduced. Plastic packing on a unit-volume basis is more expensive than wood, but the resulting savings comes from a reduction in tower volume, made possible by a better distribution of water, smaller droplets, and greater air flow with the plastic grid design. Two towers with plastic packing will do the job of three towers with wood packing. Since this development of improved tower packing, a number of basic design advances have been made possible by the use of plastics in cooling-tower construction. The following are three examples. (1) Packing with modules of polystyrene sheets, arranged vertically, gives advantages of light weight, compactness, and ease of shipping, installation, and maintenance. Also, the packing is fungus proof, rot resistant, does not soak up water, and is fairly impervious to algae and scale buildup. (2) Reinforced plastic replacing steel in construction of both casing and sump in small cooling towers has reduced the operating weight of the towers to 50 percent of the weight of conventional towers. (3) Built-up polystyrene or polyvinyl chloride strips for the rotor in a rotary cooling tower gives outstanding compactness. Very high heat-exchange rates are claimed, and corrosion, deterioration, and fouling problems are eliminated.</p> | <p>0.35</p> <p>very soluble in oil and fatty acid methyl esters. In this study they required operation in a heterogeneous system. In a series of SaEn chelates, NiII, FeII, CuII, and ZnII showed definite catalytic activity; CoII did not catalyze autoxidation of methyl oleate, but did catalyze autoxidation of a methyl linoleate-linolenate mixture.</p> <p><u>Soluble chelates.</u>--To study chelate behavior on homogeneous systems, the authors developed a new series that retained the catalytic properties of SaEn chelates, but were more soluble. These "soluble" chelates were formed from salicylaldehyde and 1,3-propylene diamines substituted in position 2 with various fatty chains. Different chain lengths were found to affect chelate stability.</p> <p>The authors found that the new chelates also varied in catalytic activity, depending on the metal employed. Activity was greatly influenced by fatty chain length, and it was about 10 times greater than that of the SaEn chelates.</p> <p>A Warburg respirometer was used to study oxidation kinetics. In general, results on both SaEn and soluble chelates confirmed data obtained earlier--that widely varying activities can be obtained and soluble chelates are more active than SaEn chelates.</p> <p>A separate study was made to determine the stability constants of SaEn and soluble chelates and to establish a relation between structure and activity of catalysts.</p> <p>The authors found that chelates with oleic chains were the most active among those studied, and ZnII chelates were not autocatalytic.</p> |
| <p>0.117 (Cross Reference: 7.8)</p> <p>the reflux trickled back into the solution, and (3) reaction without a sieve. The conversion of dimethyl terephthalate into di-t-butyl terephthalate was used as an example.</p> <p>When the separation was attempted without a sieve, it was found that, despite a threefold excess of t-butyl alcohol, the equilibrium was unfavorably situated. Selective removal of the methanol by distillation was difficult.</p> <p>Suspending the sieve in the reaction mixture at 80°C. resulted in a very rapid quantitative conversion. The Soxhlet technique was somewhat more time-consuming than the suspension method, owing to the transport phenomenon, but this method had the advantage of a very simple isolation of the resulting ester.</p> <p>This ester interchange technique proved successful with various other combinations, including aliphatic, alicyclic, and aromatic esters, reacting with aliphatic alcohols. Following purification, the yields of esters were always better than 90 percent. For the ester interchange of methyl benzoate with phenol, p-xylene was used as the solvent, and a quantitative conversion into phenyl benzoate was obtained.</p> <p>The method is not restricted to methyl esters. With a sieve type 5A, it can also be applied to displace any linear primary alcohol fragment in esters by branched alcohols. The procedure seems promising in the ester interchange of several types of alkoxy-metal compounds.</p> | <p>0.30</p> <p>and 105 percent, respectively). Calcium sulfate is a better drying agent but only takes up about 6.6 percent of its weight in water.</p> <p>Calcium sulfate was investigated to determine if any improvement could be made over the conventional procedure of using sodium sulfate. Both sodium sulfate and calcium sulfate dehydrated water-saturated ether and ethanol containing 25 percent v/v water. In this case, calcium sulfate was more effective. Ethanol containing 2 percent v/v water was unaffected by sodium sulfate, but calcium sulfate reduced the water content to 0.6 percent v/v.</p> <p>Investigations were then carried out on a 10 percent v/v solution of ethanol in ether saturated with water. This system simulated the ether extract of black-currant distillates. Calcium sulfate was more efficient than sodium sulfate and reduced the water from 1.28 percent to 0.62 percent. The figure of 1.28 percent, which is the lowest obtainable with sodium sulfate, does not seem large; however, when several liters of extract have to be concentrated to a few milliliters, the proportion of water remaining becomes serious.</p> <p>A commercial ether extract of black-currant distillate was dried with sodium sulfate (300 grams per liter) followed by an amount of calcium sulfate (200 to 250 grams per liter) calculated to give an excess over that required to remove water. The results were (1) after treatment with sodium sulfate, 1.28 percent w/v water; (2) after treatment with calcium sulfate, 0.195 percent w/v water; and (3) after concentrating the extract to 75 ml. and treatment with calcium sulfate, 0.185 percent w/v water.</p> |

2.05 SURVIVAL OF CLOSTRIDIUM PERFRINGENS IN STARCH PASTES

Strong, Dorothy H., Karl F. Weiss, and Lynn W. Higgins (Department of Foods and Nutrition, University of Wisconsin, Madison)
Journal of the American Dietetic Association 49, No. 3, 191-195 (September 1966)

The survival of Clostridium perfringens at refrigerator and freezer temperatures has been the subject of several investigations. The spores of C. perfringens in small frozen beef blocks have been found to survive 26 weeks at -5° and -20° C. (Barnes et al., 1963). The vegetative cells were less resistant to cold and died more rapidly at -5° than at -20° C. Two to ten percent of the initial spore inoculum and 1 percent of the vegetative cells were recovered from frozen chicken gravy after 180 days (Strong and Canada, 1964). Exposure for 2 days to -17.7° and 7.1° C. failed to kill 42 to 84 percent and 59 to 75 percent, respectively, of the spores initially present in a variety of suspending diluents (Canada et al., 1964). The number of viable spores in quick-frozen fish homogenates stored at -17.7° C. decreased, and after two or more freeze-thaw cycles, the spore count increased markedly (Raj and Liston, 1961). Other observers (Kemp et al., 1962) stated that freezing may make C. perfringens difficult to recover and suggested that food samples being investigated in cases of food poisoning be refrigerated rather than frozen.

(over)

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ABSTRACTER: E. R. Weissman

2.12 PROSPECTS OF COMMERCIAL EXPLOITATION
(*) OF 300-700 M. DEEP GROUNDS OF BERING SEA

Lestev, A. V.
Rybnoe Khoziaistvo 39, No. 11, 54-58 (1963) (In Russian)
World Fisheries Abstracts 16, No. 4, 27-28 (October-December 1965)

Exploratory trawling was continued and extended from Cape Navarin to Cape Shipunski. Each sector was first echo sounded and, if found suitable, trawled. Four hundred and ten tows were made between 300- and 700-meter isobaths. Sections of the Continental Slope of the Bering Sea (1,200 miles in total length) were found to be unsuitable for trawling. Five other sections of this slope--the northern, the southern, the northwestern, the Olyutorskii Ridge, and the Olyutorskii Bay (a total extension of 500 miles)--were found trawlable and promising. The area of each section can be trawled simultaneously by 25-30 vessels. The northern sections are open to fishing from June to November, the southern ones throughout the year. Japanese longline and driftnet fishing, and Danish seining activity were observed in all areas. Average catches per hour ranged from 0.55 tons in the northern section to 1.14 t. in the southern section. Hauls of 2-3 t. were usual, although hauls of 4-10 t. occurred. The most productive depths in each of the five sections were as follows: northern, 300-350 and 400-450 m.; southern, 350-500 and 550-650 m.; northwestern, 300-650 m.; Olyutorskii Ridge, 450-550 m.; and Olyutorskii Bay, 350-450 and 550-700 m. The composition of the catches is shown below:

(over)

*Item on back of card.

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EXTRACTOR: L. Baldwin

SURVIVAL OF CLOSTRIDIUM PERFRINGENS
DEEP-WATER TRAWLING IN THE BERING SEA

2.1471 RESULTS AND PROSPECTS OF DEEP WATER TRAWLING
(*) IN BERING SEA

Zakrizhevskii, N. I., and Kulikov, M. Yu.
Rybnoe Khoziaistvo 39, No. 11, 52-54 (1963) (In Russian)
World Fisheries Abstracts 16, No. 4, 27-28 (October-December 1965)

Exploratory trawlings in deep waters of the Continental Slope in the Bering Sea resulted in (1) the discovery of major concentrations of bottom fish, mainly at depths of between 300-500 meters and (2) the conclusion that trawlers are able to fish at depths down to 700 m. Three different types of trawl nets were used, their footropes rigged according to the character of the grounds; they were towed at 2.8-3.4 knots and at 3.5-4.0 knots. At depths of between 250 and 500 m., the warp scope was 2.5; at depths exceeding 500 m., it was 2.3-2.2. Catches increased by one-third with the faster tows when an additional 50-70 m. of warp was paid out. Tows were either oblique, from deeper to shallower grounds, or along isobaths. During April-May, the area between Krenitsin Islands and 178°30'W. (for example, in the southeast and central sections of the Continental Slope) was surveyed. During July-August, the area between Krenitsin Islands and 174°E. was surveyed. Best catches were obtained in the central section; the average catch was 1.56 tons per hour; the maximum was 7 t. per hour. In the southeastern section, the average was 0.7 t. per hour and the maximum was 8 t. per hour. The main fish caught were American and Asiatic arrow-toothed halibut (Atheresthes stomias and A. evermanni, respectively), coalfish, Pacific ocean perch (Sebastes alutus), and big perch (over)

*Item on back of card.

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EXTRACTOR: L. Baldwin

2.1475 THE FUTURE OF PURSE SEINING

Smettem, J. L.
World Fishing 16, No. 1, 36-38 (January 1967)

The success of power-block purse seining efforts by Iceland and Norway has focused the attention of fishermen from other nations on this method of pelagic fishing. Icelandic and Norwegian fishermen--using a combination of purse seine, power block, and echo-range finder--have revolutionized the North Sea herring industry. The British have been testing this method and the results indicate a good potential for this type of purse seining.

If the method were to be adopted in earnest, suitable vessels would have to be found. Until the method is proved, a short-term solution would be to convert existing seine net, drifter, or trawler vessels to power-block purse seining.

Motor fishing vessels of the type used in Scotland could be used for limited coastal fishing, but they would be dependent on the coastal herring streams for a source of supply. A change in behavior patterns, taking the herring further out to sea, would incapacitate a fleet of limited size and capacity. Icelandic and Norwegian fishermen have been forced to range farther out to sea; their newer ships are quite large.

(over)

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ABSTRACTER: E. R. Weissman

TRAWLING FOR BOTTOM FISH IN THE BERING SEA
EUROPEAN POWER-BLOCK PURSE SEINING

Composition of catches during exploratory trawling in the Bering Sea
from Cape Navarin to Cape Shipunski

| Sector | Coalfish Percent | Halibut Percent | Redfish Percent | Grenadier Percent | Other Percent |
|----------------------|---------------------|--------------------|--------------------|----------------------|------------------|
| North | 15.1 | 48.3 | 28.0 | 0.5 | 8.1 |
| South | 44.6 | 47.2 | 4.6 | 2.5 | 1.1 |
| Northwest | 34.3 | 20.8 | 7.6 | 25.4 | 11.5 |
| Olyutorskii Ridge | 15.25 | 2.5 | 27.0 | 50.15 | 5.1 |
| Olyutorskii Bay | 19.3 | 27.1 | 18.1 | 21.0 | 14.5 |

Halibut and coalfish were most abundant at depths of 450-550 m., grenadier at 550-650 m., and redfish at 300-450 m.

(Abstract of this article appears under 1.019 page 3 - May 1967)

BLUEPRINT FOR A FISHERY

2.12

Allsopp, W. H.
World Fishing 15, 48-49, 64 (May 1966)

The present article is concerned with the survival of *C. perfringens* suspended in a starch-thickened paste after a single freeze-thaw cycle or refrigeration. The authors wished to learn whether this organism and its spores survived freezing or refrigeration in starch paste only when meat was present or survived in other types of starch paste. Starch pastes were used because, in one form or another, they are part of a great number of foods. In these studies, strains of *C. perfringens* were suspended in starch paste, starch-sugar paste, and starch-meat paste. Five strains of *C. perfringens* were investigated.

After 180 days of freezer storage, 5 to 43 percent of the total cells and 65 percent of the spores appeared to be viable. After 361 days of refrigerated storage, 11 percent of the total cells and 14 percent of the spores were viable. There was greater destruction of total cells and spores at 5°C. during very short holding periods. The storage of starch paste at 5°C. produced greater total cell and spore survival than at 11°C. or 15°C.

In addition to the starch-sugar or starch-meat paste prepared to aid *C. perfringens* survival, a starch-sugar paste was prepared to aid *C. perfringens* survival. After that time, the meat ceased to have any effect, though the sugar continued to be effective. The authors say that the survival rate at that time in the starch-sugar paste was higher than in the starch-meat paste. The authors refer to this as "starch-sugar paste survival".

If larger vessels, such as middle-water side trawlers, were to be converted to purse seining, several problems would arise. The most serious of these would be to maintain the stability of the vessel. The weight distribution and breadth of many British side trawlers give them a low, initial stability. In addition, the requirements of side trawling dictate a restricted freeboard and a superstructure set in from the ship's side. When rigged for purse seining with a power block, a side trawler may have a dangerously low dynamic stability. The vessel's center of gravity will be raised by the heavy net stowed on the poop deck, by hauling in the net over a power block mounted on the ship's side, and by brailing from a derrick. The latter operations can also produce a severe heeling moment. In addition, the free-surface effect of bulk-loaded herring can have a disastrous effect on stability. After several Norwegian vessels capsized, Norwegian authorities issued a comprehensive set of provisional rules regulating standards of stability for purse seiners using power blocks.

Now would be an ideal time to introduce a new type of vessel specifically designed for stern trawling or purse seining with virtually no modifications necessary other than changing fishing gear. The basic arrangement could incorporate a power block on a boom stepped to the mast for handling the purse seine, and a hydraulically operated gantry for stern trawling. This would offer the advantage of purse seining over the stern by simply transferring the power block to the gantry for shooting the net. Such a vessel would ensure maximum utilization of fish stocks and ensure against declining pelagic stocks or changes in schooling habits.

1471.2

(*Sebasticthys introniger*), grenadier (*Macrurus* sp.), yellowfin sole, and true halibut (*Hippoglossus hippoglossus*). Coalfish abounded mostly at depths of over 500 m.; arrow-toothed halibut at 300-500 m., though the latter could be found at a wide range of depths (200-700 m.).

| Fish | Range of length Centimeters | Dominant size Centimeters |
|-----------------------|--------------------------------|------------------------------|
| Arrow-toothed halibut | 30-80 | 50-60 |
| Pacific ocean perch | to 95 | 35-40 |
| Big perch | 26-62 | 55 |
| Coalfish | 26-62 | 55-55 |

Contrary to often-voiced opinions, the single-boat method of midwater trawling is not basically inferior to the two-boat method. By means of further improvements, the catching ability of the single boat can probably be considerably increased. If expectations are fulfilled, the older side trawlers of the German fleet, which are not suitable for the distant-water fisheries, could be used for short periods in the herring fishery. In view of the demand for herring in the German fishing industry, such a development would supply a need of considerable economic importance. The authors intend to continue experiments towards the further development of the single-boat method.

[Extractor: L. Baldwin]

FURTHER EXPERIMENTS WITH MIDWATER TRAWLS

2.1471

Schäfer, J., and R. Steinberg
Protokolle zur Fischereitechnik 8, No. 37, 161-230 (1963) (In German)
World Fisheries Abstracts 16, No. 3, 21-22 (July-September 1965)

| | | | |
|--------|--|--|--|
| 2.1476 | MORE FRENCH INSHORE BOATS GO GILLNETTING FOR HAKE | <p>Anonymous World Fishing 16, No. 1, 40 (January 1967)</p> <p>A number of French boats from ports in Brittany are now gill netting for hake because the traditional crawfish grounds have been closed by changes in fishery limits. The French fishermen are using gill nets in a method adopted from Portuguese fishermen.</p> <p>The nets consist of 160-ft. sections of double-knotted nylon with a mesh of 2.3 in. and a depth of between 50 and 80 meshes. The nets are mounted on $\frac{1}{2}$-in. polypropylene rope and weighted with lead. Three sets of 30 sections and 10 sections in reserve make up a fleet of nets. Two groups of nets, each with 25 sections of net, are shot about 2 hr. apart and left to fish all night. At about 7 a.m. the nets are hauled with two fish tackles mounted on the derrick and the enmeshed fish are cleared as the net comes in. Maximum care is taken to maintain quality, and the fish are quickly iced and put below.</p> <p>Damage and loss of nets is a major problem, for the fishing grounds are as yet new. The work is considered hard and is costly in labor, especially when damage to nets is heavy. Bad weather is also a serious problem, with wind speeds of over 25 knots being encountered.</p> <p>(over)</p> | <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 5 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: E. R. Weissman</p> |
| 3.12 | RESISTANT BACTERIA ON ANTIBIOTIC-TREATED FISH | <p>Adams, R., P. Lerke, and L. Farber (Seafood Research Laboratory, The G. W. Hopper Foundation, University of California, San Francisco Medical Center, San Francisco 94122) Journal of Food Science 31, No. 6, 982-987 (November-December 1966)</p> <p>This report is concerned with qualitative changes that take place in the floral spectrum of antibiotic-treated fish; in particular, the emergence of antibiotic-resistant bacteria and the practical significance of their appearance. Two aspects of the problem are examined: (1) the appearance of the resistant bacteria on antibiotic-treated fish and (2) the effect of heavy recontamination by these bacteria on the success of antibiotic treatment.</p> <p>Two groups of English sole fillets (<i>Parophrys vetulus</i>) were treated with either chlortetracycline (CTC) or oxytetracycline (OTC), stored at 5° C., and sampled daily by making duplicate bacterial counts on plain agar and on agar with antibiotic. Before antibiotic treatment the fillets contained an initial microflora of from 0-10 percent bacteria that could tolerate varying doses of CTC. This proportion of the microflora remained fairly constant or decreased on storage of untreated samples. When the fillets were treated with CTC, the proportion of the floral spectrum that was composed of resistant bacteria reached 100 percent by the 4th or 5th day and remained at this level until spoilage occurred. The effect was similar when the fillets were treated with</p> <p>(over)</p> | <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 5 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: E. R. Weissman</p> |
| 3.18 | A LIMITED STUDY ON THE SANITATION OF FISHING TRAWLER HOLDS | <p>Levin, Robert E., and F. Miles Sawyer (Department of Food Science and Technology, University of Massachusetts, Amherst), and Paul G. Scheurer (Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts) Journal of Milk and Food Technology 29, No. 11, 336-337 (November 1966)</p> <p>Efficient cleaning of the compartments and penboards used for holding fish during iced storage at sea is necessary to maintain quality and to prevent the development of bilgy or spoiled fish. The problem of bilgy fish results from contact of fish with slime-soaked wooden penboards. This study compared two methods for removing slime and reducing the bacterial flora on the wooden hold surfaces of a commercial trawler.</p> <p>The first cleaning method studied was one used by local fishermen. It consisted of conventional hand scrubbing followed by liberal hosing and flushing with untreated harbor water. The second cleaning method used a hydraulic jet cleaner to apply a chlorinated detergent heated to 180° F. and under pressure of 280 pounds per square inch. This detergent cleaning was followed by rinsing with potable water. Both cleaning methods were applied to the same vessel and the same hold. The second method was applied 25 days after the conventional scrubbing and after the vessel had completed several fishing trips.</p> <p>(over)</p> | <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 5 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: M. F. Trippie</p> |
| 2.3 | STEPS TO EFFECTIVE SANITATION IN SMOKED-FISH PLANTS | <p>Dougherty, Jack B. (Bureau of Commercial Fisheries, Inspection and Certification Office, Chicago, Illinois), and Harry L. Seagran (Bureau of Commercial Fisheries Technological Laboratory, Ann Arbor, Michigan) Circular 259, 12 pp. (April 1966) (U.S. Department of the Interior, Bureau of Commercial Fisheries, Washington, D.C.)</p> <p>The raw fish and the processing areas where fish are handled may contain large numbers of microorganisms, which accelerate the spoilage of smoked fish. Fastidious cleanliness must be maintained in a smoked-fish plant to avoid contamination of the final product. Sanitation procedures that are effective in smoked-fish plants are described in this Bureau of Commercial Fisheries' Circular, which contains sections on plant design, construction, and maintenance; water and waste systems; cleaning and sanitizing methods and materials; personal hygiene; and problem areas in regard to bacterial contamination of the smoked fish.</p> <p>Well designed, tightly constructed plant buildings, which are maintained in good repair and are made of easily cleaned materials, will facilitate the maintenance of a clean, neat plant. An adequate supply of hot and cold water from an approved source, and proper drainage are essential. Plant premises and floors should be constructed so that they can be kept as dry and as free from the accumulation of water as possible. Windows and doors should be screened. Waste materials must be properly disposed of daily.</p> <p>(over)</p> | <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 5 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE</p> <p>ABSTRACTER: E. R. Weissman</p> |

2.3 (Cross Reference: 3.4)

In a smoked-fish plant, it is essential to prevent bacteria being carried from the raw fish to the final product. If the fish are smoked at a high temperature, the number of microorganisms originally contained in the raw fish will be considerably reduced. It is important, therefore, that the number of bacteria in the final product not be increased artificially by transferring these organisms to the final product from raw fish, processing equipment, utensils, or other sources of contamination. Because of the possible transfer of bacteria, the raw-fish operations and the smoked-fish operations must be completely separated. Workers engaged in operations involving raw fish should remain out of the areas where smoked fish are handled.

The authors stress the following points: (1) Bacteria and other microorganisms are carried by soil, by dust particles in the air, by water, by hands, by clothing, and by other physical objects. (2) To avoid cross contamination of the smoked fish, physical separations or partitions must be maintained between raw fish, raw-fish products and handling equipment, and the final cooked, smoked products. (3) Raw fish must be cleansed of all viscera, blood, and other materials, then rinsed individually with a spray of clean water before being placed in a clean container for holding until being brined. (4) Plants and premises, and the work areas must be kept as clean and dry as possible to prevent the buildup of bacteria and to lessen the chance of cross contamination.

2.1476 (Cross Reference: 1.0148)

The advantages of gill netting lie in the savings in fuel and ice consumption and in the value of the catch, which is more valuable than the catch taken in trawling. Some 20 boats are said to be engaged in the gill netting, and it now remains to be seen whether the expense of special hauling gear and even special boats can be justified by the new fishing grounds.

3.18

Swab samples were taken at 13 locations on the wooden fish compartment surfaces immediately after the cargo of fish was unloaded. Immediately after cleaning, 13 swab samples were taken from locations adjacent to the former sampling sites.

The surfaces of the fish-storage compartment were heavily coated with slime and debris after the fish had been unloaded. After being hand scrubbed the surfaces appeared to be clean and free of slime; however, bacterial counts indicated that hand scrubbing with harbor water failed to remove the heavy load of microorganisms. The contamination was undoubtedly due to slime trapped in the pitted surfaces of the wood. The use of untreated harbor water might also contribute to the bacterial load.

The application of hot detergent reduced the bacterial load by 100 times over most of the hold surfaces. The greatest reduction was 99.89 percent; only two samples failed to show at least a tenfold reduction in count.

The results of previous work (MacCallum, 1955; and Spencer, 1961) and the results of this comparison indicate that conventional hand scrubbing of porous wooden surfaces with untreated harbor water is unsatisfactory in removing the bacterial population. The application of hot pressurized detergent is more effective in reducing bacterial contamination on porous wooden surfaces of fish holds. The use of aluminum sheeting or the application of plastics, such as polyphenol, polyurethane, and urea-formaldehyde resins, to wooden fish compartment surfaces to render them impervious to bacteria and to facilitate efficient reduction of the bacterial load would offer considerable advantage in the sanitation of fish holds.

3.12

OTC. A further series of tests indicated that the bacteria that grew on samples treated with CTC were resistant to OTC, and vice versa.

The levels of resistance of the bacteria were determined. Fewer bacteria resisted higher levels of CTC than resisted lower levels. The proportion of resistant bacteria in untreated fillets did not increase with spoilage. The proportion of resistant bacteria in the untreated fillets either decreased or remained constant. In the treated groups, the percentage of bacteria resistant to CTC rapidly reached 100.

To determine whether the effectiveness of CTC treatment under practical conditions would be reduced by the buildup of a large resistant population because of poor sanitation conditions, the authors conducted an experiment in which the worst possible conditions to be found in a commercial plant were simulated. Fresh fillets were recontaminated with CTC-resistant bacteria over a period of time.

Results of these experiments indicated that, although the effectiveness of CTC treatment was reduced in fish recontaminated with CTC-resistant bacteria, spoilage was nevertheless significantly reduced. The bacteria apparently grew and multiplied in the presence of CTC, but their metabolic activity, as measured by spoilage production, was inhibited. The authors concluded that even though the effectiveness of antibiotic treatment was reduced, it may still be of some benefit under the worst conditions.

3.235

RECENT TECHNOLOGICAL STUDIES OF DUNGENESS CRAB PROCESSING.
PART 4. PRELIMINARY REPORT ON SALT UPTAKE
AND HEAT PENETRATION IN WHOLE-COOKED CRAB

Barnett, Harold, and Richard W. Nelson (Bureau of Commercial Fisheries Technology-
cal Laboratory, Seattle, Washington)
Fishery Industrial Research 3, No. 3, 13-16 (December 1966)

Two of the factors affecting the quality of whole-cooked Dungeness crab are
(1) heat penetration during cooking and (2) concentration of salt in the meat of
the final product. Because the salt concentration in the cook water is seldom
closely controlled, the uptake of salt by the whole crab may fluctuate widely. In-
sufficient penetration of heat results in an undercooked crab and decreases the
yield of crab meat. The present study is intended as the basis for a systematic
approach to future studies of salt uptake and heat penetration in whole-cooked
Dungeness crab. The authors believe their information will be of immediate use to
the crab-processing industry because of its relation to quality and economics.

In laboratory-cooked crab, increasing the concentration of salt in the cook
water increased the amount of salt absorbed by the crab meat. The concentration of
salt in leg meat varied from 0.54 percent for crab cooked in fresh water to 1.77
percent for crab cooked in brine at a strength of 97°, as measured by a salinometer.
The uptake of salt in the body meat increased in a manner similar to that in the
(over)

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UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

ABSTRACTER: E. R. Weissman

3.2495

PROTEIN DENATURATION IN FROZEN FISH.
XI - THE PROPORTION OF TISSUE WATER CONVERTED TO ICE

Love, R. M. (Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 17, No. 10, 465-471 (October 1966)

This series of reports has been concerned with the changes (denaturation) that
occur during low-temperature storage of fish-muscle proteins. It is believed that
tissue salts, greatly concentrated by freezing, are intimately associated with the re-
deteriorative changes and that the salts probably act in conjunction with the re-
lease of free fatty acids. This concept is plausible, because the proteins of
fish fillets can be readily denatured by strong salt solutions above the freezing
point. Any variation in the proportion of water to ice will affect the concentra-
tion of the salts, so a study was made of ice in cod muscle to identify further
factors that influence denaturation.

The relative amounts of water converted to ice under different conditions
were assessed by histological observation. The cell and ice areas from frozen
fish were photographed. A graticule in the eyepiece of the microscope superim-
posed about 1,000 ruled squares on the histological picture. The number of squares
with half or more of their area containing ice was counted and expressed as a per-
centage of the total number of squares. This method had not been used before in
this context, so its reliability was studied in detail. The histological method
(over)

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ABSTRACTER: M. F. Tripple

QUALITY CONTROL OF WHOLE-COOKED CRAB

PROTEIN DENATURATION IN FROZEN FISH

3.2495

ULTRACENTRIFUGAL ANALYSIS OF CHANGES IN THE COMPOSITION
(*) OF MYOFIBRILLAR PROTEIN EXTRACTS OBTAINED FROM FRESH
AND FROZEN COD MUSCLE

King, Frederick J. (Bureau of Commercial Fisheries, Gloucester, Massachusetts 01930)
Journal of Food Science 31, No. 5, 649-663 (September-October 1966)

There have been relatively few frozen-storage studies to characterize the
specific myofibrillar component whose sensitivity to denaturation induced by freez-
ing is responsible for the effects of storage on the extractability of total myo-
fibrillar protein from fish muscle. The purposes of this investigation were to use
ultracentrifugal analysis to (1) characterize the components of myofibrillar pro-
tein extracts, both quantitatively and qualitatively; (2) study the effect of
storing extracts containing cod myofibrillar proteins; and (3) study the effect of
storage on the amount of total myofibrillar protein in frozen cod muscle extracts
and characterize the components of these extracts.

Extracts from stored, frozen cod muscle showed that the extractability of the
components detected by ultracentrifugal analysis changed at different rates than
did the extractability of total myofibrillar protein. Analogous results were ob-
tained by storage of extracts as "model systems." The results supported the pos-
tulated reaction scheme of stepwise dissociation and aggregation in which F-acto-
myosin \rightleftharpoons G-actomyosin \rightleftharpoons G-actin + myosin \rightleftharpoons inextractable protein. Storage condi-
tions that decreased the amount of soluble F-actomyosin displaced these reactions
toward dissociation and aggregation into insoluble protein.

*Item on back of card. (over)

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ABSTRACTER: M. F. Tripple

3.2495

NUCLEOTIDE DEGRADATION AND QUALITY IN ORDINARY
AND RED MUSCLE OF ICED AND FROZEN SWORDFISH
(XIPHIAS GLADIUS)

Dyer, W. J., Doris I. Fraser, and Dianne P. Lohnes (Fisheries Research Board of
Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 23, No. 12, 1821-1833 (December
1966)

The major nucleotide in resting fish muscle, adenosine triphosphate (ATP), is
changed rapidly to inosine monophosphate (IMP) during capture or shortly after
death. The IMP is then slowly degraded to inosine, then hypoxanthine, and finally
to uric acid. Depending on the type of fish, conditions of storage, and other
factors, this process may be well advanced during the period of edibility and be-
fore bacterial spoilage occurs. Studies have been conducted on the relation of
flavor to the major purine nucleotides, nucleosides, and bases in a number of
commercially important species of fish. The rate and extent of nucleotide de-
composition and its possible association with undesirable flavors in swordfish
(*Xiphias gladius* L.) were studied.

Swordfish were held on ice up to 19 days and during this time were sampled and
examined for changes in the nucleotide composition, especially the rate of hypo-
xanthine formation. Changes in quality were assessed by a taste panel. Changes
taking place during frozen storage were also investigated, since it is known that
the enzymes involved in hypoxanthine formation are also active during frozen stor-
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ABSTRACTER: E. R. Weissman

EFFECT OF STORAGE ON PROTEIN EXTRACTS

NUCLEOTIDE DEGRADATION IN SWORDFISH

was convenient and yielded reproducible results, although the results cannot be compared with those obtained by calorimetry or dilatometry.

The amount of tissue water in cod muscle that was converted to ice did not vary appreciably between freezing times of 11 and 390 minutes. This time range included both intracellular and extracellular freezing. In rapid intracellular freezing no measurable tissue water left the cells.

Denaturation from either multiple freezing or prolonged cold storage did not result in the formation of more ice. The unfreezable or bound water was not released for water formation, although the properties of the protein were fundamentally altered.

Prerigor muscle was found to bind more water and form less ice than did post-rigor muscle. Quickly frozen prerigor muscle contained less ice than did slowly frozen muscle. This finding suggested that in the slowly frozen muscle some of the changes associated with rigor mortis were already occurring. However, samples in the slowly frozen group did not appear to show any differences among themselves according to the freezing rate. Any small effect of freezing rate would be concealed by the variability of these results. [54 references]

leg meat, but at a slower rate. The concentration of salt ranged from a minimum of 0.44 percent for crab cooked in fresh water to 0.97 percent for crab cooked in a 97° brine.

An examination of commercially cooked crab indicated that it was cooked in about 64° brine, which is widely divergent from what is reported to be industrial practice. The concentration of salt in the leg meat was 1.30 percent and in the body meat was about 0.72 percent. Organoleptic tests indicated that the optimum level of salt in crab meat should be 1 percent.

Cooking in brine produced a slight, but not consistent, loss in weight in whole crab, ranging from 2.5 percent in 16° salinometer brine to 3.5 percent in 97° salinometer brine.

In commercial practice, whole crabs are normally cooked for 23 minutes. Either minimum steam or an excess of steam may be present. In the first case, the brine appears to be boiling, although the temperature is below 212° F.; in the latter instance, the brine is boiling. After a 23-minute cooking period, the internal temperature of crab cooked with a minimum input of steam was 104° F. The internal temperature of crab cooked with excess steam was 121° F. The taste of the steam-inflated crab was not judged to be as good as that of the crab cooked in steam. The taste of the steam-inflated crab was not judged to be as good as that of the crab cooked in steam. The taste of the steam-inflated crab was not judged to be as good as that of the crab cooked in steam.

age. Nucleotide breakdown has been found to occur earlier in red muscle than in white muscle, so the red muscle was also investigated.

In the iced swordfish, IMP was dephosphorylated to inosine during the 19 days of storage. The hypoxanthine level increased slowly. The swordfish were of acceptable quality up to 15 days, but they were near the limit of acceptability by 19 days. These changes occurred more slowly in swordfish than in cod and other smaller fish. The changes took place earlier in the red muscle than in white muscle; the authors suggest that the red muscle be removed if top quality is to be maintained in stored swordfish.

Rapid freezing and storage at -26° C. produced no significant change in quality after 4-5 months. Slow freezing and storage at -4° C. for 1 week reduced quality to borderline or unacceptable levels. This treatment had only a slight effect on the nucleotide degradation, so other factors produced the loss in quality. It is well known that the enzymes causing deterioration in fish have a sharp peak of activity at temperatures just below freezing. This fact should be kept in mind when handling large fish, such as swordfish, where the period during which the carcass is at this temperature range may be considerable.

No relation between changes in flavor and presence of intermediate compounds in the IMP-uric acid catabolism was detected. The characteristic sour flavor of cooked swordfish steaks may hide any loss of flavor due to IMP deterioration or any bitterness due to hypoxanthine formation.

The authors suggest that tests to determine the prefreezing quality of frozen fish might be based on the levels of IMP and hypoxanthine in swordfish muscle. [26 references]

These findings provide strong evidence for the existence of G-actomyosin, which was originally distinguished from F-actomyosin on the basis of the molecular form of its actin component. The results also suggest that G-actomyosin is a more stable form of actomyosin than is F-actomyosin. A weakness in this hypothesis is that there is no specific test for G-actomyosin in the presence of myosin, F-actomyosin, or other myofibrillar protein. More information is needed about the nature of the complexes that actin and myosin can form both in situ and in vitro, and the relation of the environments to the formation and stability of actin and myosin. If, however, myofibrillar protein is viewed as an equilibrium system with G-actomyosin included, instead of as a simple mixture of actin, myosin, and F-actomyosin, the reaction scheme is the result. This scheme might provide a useful working hypothesis to consistently explain the effect of commercial storage or processing conditions on myofibrillar protein denaturation in fish muscle, and explain how these conditions displace equilibria between the actin, myosin, and actomyosin components.

(Abstract of this article appears under 4.23 page 13 - May 1967)

Bligh, E. G., and Margaret A. Scott
Journal of the Fisheries Research Board of Canada 23, No. 7, 1025-1036 (July 1966)

LIPIDS OF COD MUSCLE AND THE EFFECT OF FROZEN STORAGE

Merritt, J. H., and A. Banks
Torry Memoir No. 190, 8 pp. (1964)
World Fisheries Abstracts 16, No. 3, 35-36 (July-September 1965)

Since 1956, various methods of thawing have been examined at the Torry Research Station, including dielectric thawing, electric resistance thawing, thawing in water, and thawing in air. Dielectric thawing and air blast thawing have been used commercially on blocks of whole fish. Laboratory tests have been made on the water thawing of blocks of cod. The present tests were made (1) to determine the optimum conditions for thawing in air blast and in water, from the point of view of fish quality; (2) to assess the times required for thawing; and (3) to provide basic data for design purposes.

Thawing times in all cases were not well defined because the rate of thawing fell off towards the end of each run, and thermocouples in the fish were thus never a reliable guide. In addition, fish of different sizes were often frozen in a single block, and the smaller fish inevitably thawed before the larger ones. It was noted that complete thawing was not necessary to obtain a product that could be filleted satisfactorily. If too much ice did not remain in the fish, and if the backbone were not encased in a knob of ice, an experienced filleter could produce satisfactory fillets from a fish that was not completely thawed.

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EXTRACTOR: L. Baldwin

Anonymous

Indian Fisheries Bulletin 10, No. 4, 17-18 (October 1963) (Ministry of Food and Agriculture, New Delhi, India)

Salt curing is one of the oldest methods of preserving fish. In some countries, such as India, salt-cured fish forms the bulk of the fishery products and large quantities are exported. In spite of the advent of processing methods such as canning and freezing, salt curing is still an important industry. To retain the existing markets and to open up new markets, the salt-cured fish industry must become quality conscious and there is much room for improvement. Conditions found in curing places often point out the need for improvements in the hygienic conditions and strict adherence to the proportions of fish to salt that are prescribed by state fisheries departments. The delay between catching of the fish and its salt curing must be reduced.

When 250 samples of salt-cured fish from different regions of India were examined, nearly one-third of the samples were found to have a poor appearance and a putrid odor and to be infested with red halophilic bacteria and mold. When the samples were chemically analyzed, most of the spoiled meat had moisture contents of nearly 40 percent. Fish in good condition had a moisture content of less than 35 percent. About 50 of the examined samples contained less than the prescribed amount of salt. Salt content was high in some of the samples.

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ABSTRACTOR: M. F. Tripple

Zięcik, M., Z. Podeszewski, and E. Kosiakowski
Zeszyty Naukowe Wyższej Szkoły Rolniczej W Szczecinie, Rybactwo Morskie I, No. 22,
230-231 (1966) (Stettin, Poland)

While attempting to obtain liquid foodstuffs from fish and their waste products, the authors investigated the changes occurring within some nitrogen and phosphorus compounds during formation of the autolysate.

The Baltic sprat was used as the raw material. The autolysate was obtained by adding sulfuric and formic acid at a temperature of +18° C. to 1 kg. of fish. During the first attempt, 0.06 kg. of 50 percent sulfuric acid, with an initial pH of 2, was added to 1 kg. of fish. In the second attempt, 0.02 kg. of 85 percent formic acid, with an initial pH of 3.5, was added to 1 kg. of fish.

The analyses were made after 1, 3, 4, 15, and 30 days. They included determination of the chemical composition and of the basic nitrogen and phosphorus compounds of the entire autolysate, as well as of its liquid and solid components. The dynamics of the autolysis process were characterized by changes of protein and nonprotein nitrogen.

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ABSTRACTOR: M. F. Tripple

Brockerhoff, H., R. J. Hoyle, and P. C. Huang (Halifax Laboratory, Fisheries Research Board of Canada, Halifax, Nova Scotia)
Canadian Journal of Biochemistry 44, No. 11, 1519-1525 (November 1966)

Stereospecific analysis of triglycerides (that is, analysis of the fatty acid compositions in the three sterically different positions of glycerol) can be achieved by degrading a triglyceride to its α , β -diglyceride with pancreatic lipase, converting the diglyceride into a racemic phospholipid, and resolving the phospholipid with the stereospecific enzyme phospholipase A. However, this method is not applicable to marine oils because pancreatic lipase will yield diglycerides enriched in 20:5 and 22:6 rather than the required representative acids with the proper fatty acid composition. This problem can be solved by degrading the triglyceride with a Grignard reagent instead of lipase. The authors introduced several other minor modifications so they could analyze polar bear fat as a representative marine oil. They also analyzed seal fat in the same manner.

The table presents the results of the stereospecific analyses of polar bear fat and seal fat. The data have been rounded out to full percentages.

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ABSTRACTOR: M. F. Tripple

3.5

The following suggestions are presented to assist the salt-curing industry in the production of a quality product:

1. Use fresh, raw fish and do not allow the fish to remain unprocessed and uncured for a lengthy period of time. If a delay is unavoidable, the fish should be preserved in an adequate amount of ice.
2. Strictly adhere to salt ratios and use liberal amounts of good quality salt. The amount of salt used will depend on the size of the fish to be cured; small size fish will require one part of salt for every six to eight parts fish and bigger fish will require one part of salt for every three to four parts of fish. Dipping the fish in a 4-percent salt solution will increase the storage life.
3. Completely dry the cured fish. Cured fish with a moisture content of less than 35 percent will not spoil quickly. The lesser moisture content promotes a better keeping quality.
4. Maintain strict hygienic conditions during processing and avoid contamination by insects. Do not use the brine left after curing for another batch of fish.
5. Adopt a uniform method of curing to maintain a product of consistent quality.

3.6

In the early experiments, it was observed that after 2 or 3 hr. in the chawer, fish in a block could be separated quite easily by hand and if the blocks were broken up in this way, the thawing time could be reduced by about 10 percent.

Semifluid materials, such as minced fish or fish roe frozen in regular block shape, can be thawed rapidly between contact plates in a hot-press system. In the hot-press system, the plate temperature can be raised to 40°-50° C. without causing excessive heating of the thawed material, which, by virtue of the mechanical pressure exerted, is removed continually from the system. Blocks of minced herring 8 cm. thick can be thawed completely within 1 hr. Thawing is even more rapid with frozen blocks of fish roe.

THAWING OF BLOCK FROZEN FISH BETWEEN CONTACT PLATES

3.27

Hansen, P.
Livsmælesteknik 7, No. 1, 6-8 (1965) (In Danish, English abstract)
World Fisheries Abstracts 16, No. 3, 35-36 (July-September 1965)

4.11 (Cross Reference: 1.951)

Fatty acid distribution in polar bear fat and seal fat

| | Position | Fatty acid (mole percent) | | | | | | | | | |
|------------|----------|---------------------------|------|------|------|------|------|------|------|------|--|
| | | 14:0 | 16:0 | 16:1 | 18:1 | 20:1 | 22:1 | 20:5 | 22:5 | 22:6 | |
| Polar bear | 1 | 2 | 5 | 7 | 27 | 31 | 7 | 4 | 6 | 7 | |
| | 2 | 5 | 7 | 24 | 45 | 4 | 1 | 1 | 2 | 2 | |
| | 3 | 1 | 3 | 8 | 30 | 25 | 2 | 4 | 13 | 13 | |
| Seal | 1 | 4 | 11 | 15 | 29 | 18 | 8 | 3 | 2 | 3 | |
| | 2 | 11 | 13 | 30 | 30 | 3 | 1 | 1 | 1 | 1 | |
| | 3 | 1 | 4 | 14 | 26 | 16 | 7 | 8 | 6 | 10 | |

The fatty acid distribution patterns of the polar bear and seal fats are quite similar. This similarity cannot be explained by assuming the polar bear retains the pattern of the principal dietary fat, seal blubber, because the fats of mammals are completely hydrolyzed and resynthesized before deposition. The fate of the different fatty acids must be similar in the biosynthesis of both fats. In both polar bear and seal the marine polyenoic acids are not treated as they are in fish or invertebrates, or as linoleic acid is treated in other mammals. As the animals are not closely related, this strengthens the theory that mammals, in general, may put these polyenoic acids into positions 1 and 3 of triglycerides and thereby distinguish them from linoleic acid.

Linoleic acid occurs in too small a concentration to permit a reliable stereospecific analysis and traces of other acids may also be present in the same peak. However, it is unusual that this component is accumulated in the 6-position as linoleic acid is accumulated in the fat of other mammals. The same situation is also true for the fat of the seal. [11 references]

3.9

The autolysis of the sprat proceeded more rapidly with 80 percent formic acid at pH 3.5 than with 50 percent sulfuric acid at pH 2.0. The decisive role was played by the pH conditions, which were more adequate at pH 3.5 for activation of enzymes of the cathepsin group that play a major part in breaking up the muscular portion of the fish.

The process of autolysis was most vigorous during the first 7 days. The deamination of acids during autolysis was insignificant. The simultaneous determinations of volatile ammonium alkali, ammonia, and nonprotein nitrogen confirmed the different course of autolysis with sulfuric and formic acids. The different course of autolysis with each acid affected the consistency of the resulting autolysate. The fish autolysed with sulfuric acid could be broken up into a liquid and a solid portion by centrifugation. The fish autolysed with formic acid could not be separated.

The information on these transformations and the chemical composition of the fish treated with the two acids are presented in tables. The transformation of the phosphoric compounds was the same with the two acids; however, it was achieved faster in the sprat acidified with formic acid.

During the process of autolysis an increase was seen in the amount of the inorganic phosphorus and organic ester phosphorus formed by the disintegration of nucleic acids, phosphoproteins, phosphocreatine, and parts of the osseous system.

The foodstuffs obtained from the sprat are rich in assimilated nitrogen and phosphorus compounds, and in the mineral salts formed by the breakup of the skeletal system. [14 references]

4.19

PHOSPHOLIPIDS OF MARINE ORIGIN
IV - THE ABALONE (*HALIOTIS* MIDA)E)

De Koning, A. J. (Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Town, South Africa)
Journal of the Science of Food and Agriculture 17, No. 10, 460-464 (October 1966)

The abalone (*Haliotis midae*) was investigated as part of a study on phospholipids of marine origin. The unusual character of phospholipids isolated from marine invertebrates has been shown--a sphingolipid containing 2-aminoethylphosphonic acid has been detected in the sea anemone (*Anthopleura elegantissima*), a large proportion of plasmalogens have been detected in the lipids of marine invertebrates, and α -glyceryl ether phospholipids have been found in molluscan tissues. The objective of this part of the study was to obtain the complete composition of the abalone phospholipids.

Abalone lipids contained a 70-percent proportion of phospholipids. Equally high values have been previously reported for several marine invertebrate species. The nonphosphorylated lipids, which accounted for 30 percent of the phospholipids, were rich in sterols.

Outstanding features of the abalone phospholipids were the abundance of plasmalogens and the presence of a sphingolipid (ceramide aminoethylphosphonate), (over)

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ABSTRACTER: M. F. Tripple

6.190

NUTRITIVE VALUE OF FOND-REARED FISH AND CHICKEN,
AND THEIR VALUE IN IMPROVING CEREAL DIETS

Kik, M. C. (Agricultural Experiment Station, Division of Agriculture, University of Arkansas, Fayetteville)
Bulletin 716, 31 pp. (August 1966) (Agricultural Experiment Station, Division of Agriculture, University of Arkansas, Fayetteville)

This bulletin reports on extended studies of the nutritional improvement of diets containing milled and whole cereal grains and other plant foodstuffs when these diets were supplemented with small amounts of animal foods of high protein content. The high protein supplements included fish protein concentrate (FPC) and largemouth black bass, red catfish, gizzard shad, and rainbow trout. In addition, the amino-acid contents of fish, fish eggs, and fish liver were determined, and the availability of amino acids in the gizzard shad was studied.

Albino rats were fed each ration for 10 weeks. Each week the rats were weighed and the food consumption was recorded. Increases in weight of the test rats and protein efficiency ratios (PER) were used as indices of improvement caused by supplementation.

The rations of cauliflower, millet, sorghum, rye, and cabbage were improved by the addition of small amounts of gizzard shad and FPC. The rations of milled and whole yellow corn, and milled white corn were improved by supplements of FPC (over)

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ABSTRACTER: M. F. Tripple

PHOSPHOLIPIDS OF ABALONE

SUPPLEMENTING DIETS WITH FISH

7.51

MICRODETERMINATION OF ADENOSINE DIPHOSPHATE
AND ADENOSINE TRIPHOSPHATE IN PLASMA
WITH THE FIREFLY LUCIFERASE SYSTEM

Holmsen, Holm, Inger Holmsen, and Arvid Bernhardsen (Institute for Thrombosis Research, University Hospital, Rikshospitalet, Oslo 1, Norway)
Analytical Biochemistry 17, No. 3, 456-473 (December 1966)

A method is reported for the estimation of adenosine diphosphate (ADP) in ethanolic extracts of plasma by conversion of the ADP to adenosine triphosphate (ATP) with a pyruvate kinase system and the subsequent determination of the ATP formed with commercial firefly lantern extract. The pyruvic kinase reaction gives almost 100 percent yield at pH 8 and has been shown to be independent of the presence of adenosine monophosphate (AMP). The reaction is inhibited by ATP, but this inhibition is abolished by increasing the Mg^{++} concentration.

A simple device is described for dark injection of the firefly lantern extract into the cuvet with the test solution, permitting measurement of the initial light flash. This device ensures measurement of ATP without the interference of ATP-regenerating systems in the crude firefly lantern extracts.

Preparation of ADP and ATP in plasma--(1) Plasma (1.5 ml.) is placed in 96 percent ethanol (1.5 ml.) cooled in ice. The solution is thoroughly mixed and centrifuged at G_{max} 12,000 g for 12 min. at $-4^{\circ}C$. (2) Three ADP solutions of (over)

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ABSTRACTER: M. F. Tripple

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STABILITY OF MALIC ENZYME IN FISH FLESH AT $+3^{\circ}C$.

Gould, Edith (Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts 01930)
Journal of Food Science 31, No. 6, 829-831 (November-December 1966)

Previous investigation by the author (Gould, 1965) showed that activity of the malic enzyme [L-malate: nicotinamide adenine dinucleotide phosphate oxidoreductase, EC 1.1.1.40] about doubled after a single freeze-thaw cycle of the fish flesh. This freezing-induced activity remained fairly constant in fish held at $-29^{\circ}C$, but it dropped with time in fish held at $-7^{\circ}C$. The present study was conducted to determine whether similar changes in the endogenous malic enzyme activity occur in fish held at $+3^{\circ}C$.

Samples were taken from fresh haddock filets (*Melanogrammus aeglefinus*). Half of the samples were irradiated at intervals of 0.25 Mrad up to 1.0 Mrad and stored at $+3^{\circ}C$; the remaining samples were irradiated at intervals of 0.25 Mrad up to 4 Mrads and were tested immediately.

Although the supernate volume increased erratically with increased radiation dose and storage time, samples irradiated at up to 1 Mrad maintained a fairly constant level of ME activity during the 3-week storage period. Unirradiated controls showed both an increase in ME activity and a considerable level of (over)

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ABSTRACTER: E. R. Weissman

MICRODETERMINATION OF ADP AND ATP

MALIC ENZYME STABILITY IN FISH

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and gizzard shad. The rations of whole and milled wheat, and whole barley produced favorable results when supplemented with FPC. Rations of potato granules, flour and flakes, and cooked pinto beans, cottonseed meal, and soy protein concentrate were improved by supplementation with gizzard shad and FPC. The growth of the rats on breakfast foods, such as mixed cereal and oatmeal, was improved by adding small amounts of gizzard shad, bass, and FPC. The addition of shad and bass also improved the PER of the ration. However, a 3-percent addition of gizzard shad did not improve a corn germ meal ration.

Data are given on the effect of trout as a supplement to rations of milled white rice, cooked pinto beans, milled wheat, potato flour, and milled white corn. The amino acid, vitamin, and mineral contents of the pond-reared fish, fish eggs, and fish liver used in the study are reported. Data are presented on body gains and PER of diets of some pond-reared fish and the FPC. The results of the metabolism experiments indicate a high amino-acid availability in the proteins from shad. Tables are used extensively to report data from the various aspects of the study.

The author concludes that high protein foods, such as fish and their organs, which are rich in essential and nonessential amino acids, are good supplements for milled and whole grains and other plant foodstuffs. Plant foodstuffs are generally low in protein and in the amino acids lysine, tryptophan, threonine, and methionine. The beneficial effect of vitamin B₁₂ from fish on growth should be recognized and utilized. [50 references]

4.19

which liberated 2-aminoethylphosphonic acid on hydrolysis. The plasmalogens that comprised about 23 percent of the total phospholipids were mostly of the ethanolamine type.

The abalone phospholipid fraction that contained 2-aminoethylphosphonic acid could be separated from other phospholipids by silicic-acid chromatography. The isolated fraction was rich in sphingosine, and it would seem to be the sphingolipid with a structure similar to that of sphingomyelin, the difference being that phosphorylcholine is replaced by 2-aminoethylphosphonic acid at the terminal hydroxyl group of sphingosine.

Abalone phospholipids contained 6 percent of ceramide aminoethylphosphonate, which was less than the 12 percent in sea anemone phospholipids. The phospholipid pattern of abalone differed from that of fish phospholipids in that it contained less phosphatidyl choline (41 percent as compared to 53-71 percent) and more phosphatidyl ethanolamine plus ethanolamine plasmalogen (32 percent as compared to 21-26 percent).

The average unsaturation of the phospholipid fatty acids of abalone with 1.9±0.1 double bonds per molecule was significantly lower than the corresponding values of other marine phospholipids. Phospholipids of the rock lobster (*Jasus lalandii*), hake (*Merluccius capensis* Castelnau), and pilchard (*Sardina ocellata* Jenyns) had average unsaturations of 2.3, 3.1, and 3.2 double bonds per molecule, respectively.

The fatty acid distribution of abalone phospholipids and nonphosphorylated lipids was similar; the only difference was that the phospholipids contained more arachidonic (C-20:4) and docosahexanoic (C-22:6) acids at the expense of palmitoleic (C-16:1) and oleic (C-18:1) acids. [27 references]

7.591 (Cross Reference: 3.15)

bacterial contamination. After 2 weeks of storage, spoilage had set in, and assay of the unirradiated controls was discontinued. The irradiated samples had little bacterial contamination at 12 days and remained moderately odor-free at the end of 3 weeks. It is believed that the increased ME activity in the unirradiated controls was due to bacterial activity rather than to endogenous activity in the flesh enzyme system. Increasing the radiation dose above 1 Mrad measurably impaired the ME activity.

In contrast to the loss of ME activity in haddock flesh held at -7° C., ME activity maintained a uniform concentration in haddock flesh held aseptically at +3° C. for 3 weeks. The author concluded it would not be possible to use an ME index to indicate quality loss in ice-stored fish even if it were feasible with frozen-stored fish. The activity of the enzyme in the fluid of fish that have not undergone a freeze-thaw cycle is about double its activity in the fluid of fish that have undergone this cycle.

The author believes that the increase in the ME index of unpasteurized ice-stored fish would not provide a reliable measure of freshness, for several reasons: (1) fillets cut from an ice-stored fish would have a low bacterial count and correspondingly low ME index; but these fillets would have a more or less advanced breakdown of glycogen and nucleotides; (2) ME activity would be no more reliable than a bacterial plate count, and it would not necessarily indicate all the bacteria present in any event; and (3) ME values of fish held on deck in freezing weather would be deceptively and erratically high.

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known concentration are prepared in 150 mM NaCl for use as standards. Portions of each standard (1.5 ml.) and 150 mM NaCl (1.5 ml.) as a blank are transferred into portions of 96 percent ethanol in ice. (3) Plasma-ethanol supernatant (1.0 ml.) and ethanol blank (1.0 ml.) are placed in respective portions of 3 ml. activated (ADP-ATP) phosphoenolpyruvate (PEP)-pyruvate kinase (PK) solution at room temperature. This solution is labeled "A." (4) Plasma-ethanol supernatant (1.0 ml.) and ethanol blank (1.0 ml.) are placed in respective portions of 3 ml. inactivated (ATP) PEP-PK solution in ice. This solution is labeled "B." (5) Solution B is heated for 6 min. at 80° C., cooled in ice, and the firefly lantern extract (FLE)-induced initial light intensity is measured. Solution A is heated for 6 min. at 80° C., cooled in ice, and measured with the same FLE as used for solution B.

The device for "dark" injection of FLE into solutions was connected to the light-detecting part of a spectrofluorometer, which allowed estimation of the initial light flash of the luciferin-luciferase reaction. The reaction was found to be proportional to the concentration of ATP and ADP, after conversion to ATP, up to 2 μM. Both nucleotides could be determined in plasma after the preparation previously described. The presence of ethanol and inorganic salts depressed the light emission, and their concentration must be carefully controlled. The determination of ATP and ADP was not affected by AMP. The presence of ADP below 1.6 μM in plasma did not affect the determination of ATP. However, ATP caused inaccuracy in the determination of ADP if present in concentrations higher than five times the ADP concentration. Using the device, as little as 0.02 μM ADP or ATP in plasma could be estimated with an accuracy of 0.6 percent. [16 references]

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| <p>7.80</p> <p>FACTORS INFLUENCING BEHAVIORAL RESPONSES TO ODOR DISCRIMINATION--A REVIEW</p> <p>Stone, Herbert (Department of Food Sciences and Nutrition, Stanford Research Institute, Menlo Park, California 94025)</p> <p>Journal of Food Science <u>31</u>, No. 5, 784-790 (September-October 1966)</p> <p>Although many factors influence behavioral responses to odors, the problems of stimulus presentation, perceptual task, solvent system, stimulus concentration, and temperature and humidity are considered the most important and timely. These problems are discussed in this review. Increased research in olfaction, along with the use of more sophisticated experimental tools, has resulted in a better understanding of the olfactory process. More basic knowledge is needed, however, if a workable theory of olfaction is to be developed.</p> <p><u>Stimulus.</u>--Presentation of a stimulus to a subject may evoke a variety of responses, which are dependent upon stimulus concentration, hedonic properties, and the perceptual task. When the stimulus concentration is reduced to approach the 50-percent threshold, the subject loses the ability to recognize the characteristic quality associated with the stimulus.</p> <p>A stimulus is usually presented to the subject in a variety of ways: as a solute in a nonodorous solvent system, adsorbed on cotton balls, or in a controlled-air system. The important factor here is the ability of the experimenter to</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> | <p>7.81</p> <p>ERRONEOUS THIOBARBITURIC ACID VALUES IN FISH TISSUES CAUSED BY THEIR NORMAL CONTENT OF FREE IRON</p> <p>Castell, C. H., and G. A. Boyce (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)</p> <p>Journal of the Fisheries Research Board of Canada <u>23</u>, No. 10, 1587-1598 (October 1966)</p> <p>Various forms of the thiobarbituric acid (TBA) reaction are used to measure lipid oxidation in plant and animal tissues and in certain oils, fats, and fat-containing foods. Because the TBA test is so widely used, a knowledge of its limitations has become increasingly important. It has been suggested (Wills, 1964) that the TBA reaction should be used with caution as a measure of lipid oxidation in certain tissues because of the error that might be caused by the natural inorganic iron in the tissues. Abnormally high TBA values have been found in homogenates prepared from certain fish tissues, even when precautions were taken to prevent the lipids from oxidizing prior to the test, and when no inorganic iron was added. This suggested an interference with the TBA test similar to that occurring in fish muscle when traces of Fe++ or Fe+++ were added. The possibility of interference prompted the authors to examine the possibility of error when the TBA test is used as a measure of lipid oxidation in tissues taken from various organs of marine fish.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> |
| <p>7.82</p> <p>FACTORS INFLUENCING BEHAVIORAL RESPONSES TO ODOR DISCRIMINATION--A REVIEW</p> <p>Stone, Herbert (Department of Food Sciences and Nutrition, Stanford Research Institute, Menlo Park, California 94025)</p> <p>Journal of Food Science <u>31</u>, No. 5, 784-790 (September-October 1966)</p> <p>Although many factors influence behavioral responses to odors, the problems of stimulus presentation, perceptual task, solvent system, stimulus concentration, and temperature and humidity are considered the most important and timely. These problems are discussed in this review. Increased research in olfaction, along with the use of more sophisticated experimental tools, has resulted in a better understanding of the olfactory process. More basic knowledge is needed, however, if a workable theory of olfaction is to be developed.</p> <p><u>Stimulus.</u>--Presentation of a stimulus to a subject may evoke a variety of responses, which are dependent upon stimulus concentration, hedonic properties, and the perceptual task. When the stimulus concentration is reduced to approach the 50-percent threshold, the subject loses the ability to recognize the characteristic quality associated with the stimulus.</p> <p>A stimulus is usually presented to the subject in a variety of ways: as a solute in a nonodorous solvent system, adsorbed on cotton balls, or in a controlled-air system. The important factor here is the ability of the experimenter to</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> | <p>7.83</p> <p>ERRONEOUS THIOBARBITURIC ACID VALUES IN FISH TISSUES CAUSED BY THEIR NORMAL CONTENT OF FREE IRON</p> <p>Castell, C. H., and G. A. Boyce (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)</p> <p>Journal of the Fisheries Research Board of Canada <u>23</u>, No. 10, 1587-1598 (October 1966)</p> <p>Various forms of the thiobarbituric acid (TBA) reaction are used to measure lipid oxidation in plant and animal tissues and in certain oils, fats, and fat-containing foods. Because the TBA test is so widely used, a knowledge of its limitations has become increasingly important. It has been suggested (Wills, 1964) that the TBA reaction should be used with caution as a measure of lipid oxidation in certain tissues because of the error that might be caused by the natural inorganic iron in the tissues. Abnormally high TBA values have been found in homogenates prepared from certain fish tissues, even when precautions were taken to prevent the lipids from oxidizing prior to the test, and when no inorganic iron was added. This suggested an interference with the TBA test similar to that occurring in fish muscle when traces of Fe++ or Fe+++ were added. The possibility of interference prompted the authors to examine the possibility of error when the TBA test is used as a measure of lipid oxidation in tissues taken from various organs of marine fish.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> |
| <p>7.84</p> <p>FACTORS INFLUENCING BEHAVIORAL RESPONSES TO ODOR DISCRIMINATION--A REVIEW</p> <p>Stone, Herbert (Department of Food Sciences and Nutrition, Stanford Research Institute, Menlo Park, California 94025)</p> <p>Journal of Food Science <u>31</u>, No. 5, 784-790 (September-October 1966)</p> <p>Although many factors influence behavioral responses to odors, the problems of stimulus presentation, perceptual task, solvent system, stimulus concentration, and temperature and humidity are considered the most important and timely. These problems are discussed in this review. Increased research in olfaction, along with the use of more sophisticated experimental tools, has resulted in a better understanding of the olfactory process. More basic knowledge is needed, however, if a workable theory of olfaction is to be developed.</p> <p><u>Stimulus.</u>--Presentation of a stimulus to a subject may evoke a variety of responses, which are dependent upon stimulus concentration, hedonic properties, and the perceptual task. When the stimulus concentration is reduced to approach the 50-percent threshold, the subject loses the ability to recognize the characteristic quality associated with the stimulus.</p> <p>A stimulus is usually presented to the subject in a variety of ways: as a solute in a nonodorous solvent system, adsorbed on cotton balls, or in a controlled-air system. The important factor here is the ability of the experimenter to</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> | <p>8.0</p> <p>STUDIES ON CHEMICAL COMPOSITION OF AMERICAN CRAYFISH (ORCONECTES LIMOSUS) MEAT AS RELATED TO ITS NUTRITIVE VALUE</p> <p>Dabrowski, Teofil, Edward Kofakowski, Helena Wawreszuk, and Czeslawa Choroszucho (Department of the Technology of Fishing Industry of University of Agriculture, Olsztyn, Poland)</p> <p>Journal of the Fisheries Research Board of Canada <u>23</u>, No. 11, 1653-1662 (November 1966)</p> <p>This study was made to determine the chemical composition of the meat from both male and female American crayfish (<i>Orconectes limosus</i> Raf.) and to establish the relations between the weight, total length, and yield of edible meat. In particular, the authors wanted to determine the basic nitrogen and phosphorus fractions and free and bound amino acids in both sexes of the American crayfish.</p> <p>Male crayfish contained a somewhat higher percentage of meat than females. The average meat yield of females 7-10 cm. long was 24.07 percent; for males of the same class it was 24.30 percent.</p> <p>An average of 80.9 percent water and 2.75 percent total nitrogen was found in the crayfish meat. Of the total nitrogen, 83 percent was protein nitrogen. The crayfish tissue contained about 17.23 percent crude protein and 14.27 percent true protein (N x 6.25). Composition of the true protein was 32.9 percent myosin, 30.1 percent myogen, 26.4 percent residual intracellular protein, and 10.5 percent protein of stroma.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: E. R. Weissman</p> |
| <p>7.85</p> <p>MICROBIAL ANALYSES OF FROZEN RAW BREADED SHRIMP</p> <p>Carroll, Bobby J., Travis D. Love, Benjamin Q. Ward, and Melvin E. Waters (Bureau of Commercial Fisheries Technological Laboratory, Pascagoula, Mississippi)</p> <p>Fishery Industrial Research <u>3</u>, No. 3, 5-11 (December 1966)</p> <p>The bacteriological standards vary widely for frozen-food products, particularly for precooked and partially cooked seafoods. Some standards permit no more than 100,000 cells per gram and one standard permits no more than 50,000 cells per gram. These diversities reflect the difficulties in establishing standards. The U.S. Army currently requires that precooked frozen seafoods have a total plate count not exceeding 100,000 cells per gram. It is recommended that frozen foods should have a maximum of 100,000 cells per gram, although higher counts could be tolerated (Fitzgerald, 1947; Fitzgerald and Conway, 1937). Since the establishment of the Army requirements, the State of Massachusetts has established more stringent standards for precooked and partially cooked frozen foods, which require that the product contain less than 50,000 cells per gram, less than 10 coliform cells per gram, and no coagulase-positive staphylococci.</p> <p>The present study was undertaken to provide some of the background data necessary for future promulgation of realistic bacteriological standards for raw breaded shrimp. The authors analyzed 164 commercially packed samples of frozen, raw breaded shrimp from 14 processing plants.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: E. R. Weissman</p> | <p>8.0</p> <p>STUDIES ON CHEMICAL COMPOSITION OF AMERICAN CRAYFISH (ORCONECTES LIMOSUS) MEAT AS RELATED TO ITS NUTRITIVE VALUE</p> <p>Dabrowski, Teofil, Edward Kofakowski, Helena Wawreszuk, and Czeslawa Choroszucho (Department of the Technology of Fishing Industry of University of Agriculture, Olsztyn, Poland)</p> <p>Journal of the Fisheries Research Board of Canada <u>23</u>, No. 11, 1653-1662 (November 1966)</p> <p>This study was made to determine the chemical composition of the meat from both male and female American crayfish (<i>Orconectes limosus</i> Raf.) and to establish the relations between the weight, total length, and yield of edible meat. In particular, the authors wanted to determine the basic nitrogen and phosphorus fractions and free and bound amino acids in both sexes of the American crayfish.</p> <p>Male crayfish contained a somewhat higher percentage of meat than females. The average meat yield of females 7-10 cm. long was 24.07 percent; for males of the same class it was 24.30 percent.</p> <p>An average of 80.9 percent water and 2.75 percent total nitrogen was found in the crayfish meat. Of the total nitrogen, 83 percent was protein nitrogen. The crayfish tissue contained about 17.23 percent crude protein and 14.27 percent true protein (N x 6.25). Composition of the true protein was 32.9 percent myosin, 30.1 percent myogen, 26.4 percent residual intracellular protein, and 10.5 percent protein of stroma.</p> <p>(over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 13 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: E. R. Weissman</p> |

7.85 (Cross Reference: 3.236)

The authors found a wide range of variability in both total plate counts and the numbers of each bacterial group that are to be expected in frozen, raw breaded shrimp. Much of the variability is inherent in the raw product itself. Total plate counts on raw shrimp beheaded immediately after being captured may vary from a few hundred cells per gram to several million cells per gram (Carroll and Ward, 1965). The authors believe that it is impossible to rely on the total plate counts as an indicator of shrimp quality. Raw headless shrimp, for example, held in crushed ice have had a total plate count exceeding 200×10^6 and still have been Grade A according to organoleptic standards.

In this study, the average total plate count per gram of shrimp was 1,000,000. Results showed that 39 percent of the samples contained fewer than 500,000 cells per gram and that 35 percent contained more than 1,000,000 cells per gram. The average coliform count for the samples examined was 59,000 per 100 grams. There was little or no relation between the coliform count, the enterococcus count, or the total plate count. *Escherichia coli* were found in 15 percent of the samples examined. There seemed to be no direct relation between *E. coli* counts and fecal streptococcus counts. The average number of enterococci was 81,000 per 100 grams. Of the samples examined, 85 percent contained members of this group. Coagulase-positive staphylococci were present in 87 percent of the samples examined. The average count for coagulase-positive staphylococci was 19,000 per gram of product.

7.80

control the concentration for as long as the experiment is in progress. Care should be used in the selection of an appropriate solvent system.

Perceptual task.--In some situations the perceptual task is relatively simple, whereas in other situations the subject is required to describe a stimulus in relation to some identified standards. Both odor quality and quantity are equally important in any sensory problems. The degree of difficulty of the perceptual task will affect the amount of training and familiarization, the response and type of response, and the maximum number of tests the subject can effectively handle per session.

Hedonic properties.--Hedonic scales should be used for sensory problems as they would permit the determination of much finer discriminations. This conclusion is based on the finding that the scale for odor pleasantness is much greater than the intensity scale.

Adaptation.--Adaptation to odors occurs rapidly in man and is dependent on stimulus concentration and exposure time. Adaptation is primarily a central phenomenon that results in an increase in stimulus detection threshold but not in proportion to the concentration of the adapting stimulus. The selection of stimuli can be quite important in influencing the results because the adaptation rate is different for various stimuli.

Temperature and humidity.--Under normal physiological conditions, temperature does not have a significant role in odor detection. Provided extreme conditions are not encountered, it is assumed that relative humidity would not cause significant changes in olfactory sensitivity. [30 references]

8.0 (Cross Reference: 1.87)

Histidine, aspartic acid, glycine, and alanine were found to constitute about 61.5 percent of the total free amino-acid content of the American crayfish. The protein of both male and female meat was found to have a similar amino-acid composition.

Raw crayfish meat contained total phosphorus on the average of 296.4 mg./100 g. raw meat. Of this amount, the acid soluble fraction constituted 36.1 percent, inorganic phosphorus 35.5 percent, and ester phosphorus 28.4 percent. This proportion varied according to sex, and organic phosphorus of female meat constituted 56.2 percent of total phosphorus while that of male meat constituted as much as 71.0 percent. The phosphorus content of the American crayfish appeared to be about 16 percent higher than that of some sea fishes and 27 percent higher than that of some fresh-water fishes.

The American crayfish meat showed a higher nutritive value than the meat of two other fresh-water crayfish species. The true protein content of American crayfish meat was 25.5 percent higher than that of *Astacus astacus* and 19.5 percent higher than that of *Astacus leptodactylus*.

The amino-acid composition of American crayfish meat, as a rule, did not differ from that of other fresh-water crayfishes. The free amino-acid fraction included 18 amino acids. The amino-acid composition of the meat protein differed from that of the free amino-acid fraction. In the protein, amino acids such as glutamic acid, leucine, and isoleucine were found to dominate, while the free amino-acid composition was mainly histidine, aspartic acid, glycine, and alanine.

The amine nitrogen content was found to be as high in the meat of the American crayfish as in the meat of other fresh-water crayfishes. [26 references]

7.879

Erroneously high TBA values were obtained from the liver, dark muscle, and other organs taken from seven species of marine fish. This error could be eliminated by conducting a portion of the test under anaerobic conditions, or by adding a mixture of ethylenediaminetetraacetate (EDTA) and propyl gallate (PG) to the tissues immediately before the test was carried out. The error in the TBA values from the white muscle of lean fish and from whole cod filets was extremely small.

A simple modification of the TBA test will eliminate any error caused by the iron normally present in the tissues or by added inorganic iron. A 1:1 mixture of EDTA and PG, in an amount equal to 1 percent of the weight of the tissue being tested, is satisfactory except when very high concentrations of free iron are present. The mixture can be added directly to the tissues that are being blended or it can be added to the tissues in the distillation flasks before any heat is applied.

The authors found that 1-20 p.p.m. of added Fe^{++} and the naturally occurring metal in some fish tissues are sufficient to produce highly erroneous TBA values. The greatest error resulting from the natural iron content of the tissues was found in the liver of lean fish, such as cod, pollock, dogfish, or skate. Liver, kidney, and heart contain proportionally greater amounts of nonheme iron than do the other tissues studied. Errors in TBA values were also found in the dark lateral muscle of all the fish tested and with the heart, spleen, and some of the other internal organs. The white muscle of the lean fish gave about the same TBA values with and without added metal-binding compounds. This result was expected, since white muscle is relatively low in total iron and still lower in nonheme iron and since dark muscle of fish is known to contain much more iron than white muscle does. [29 references]

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| <p>8.59 (*)</p> <p>TADPOLE COLLAGENASE. PREPARATION AND PURIFICATION</p> <p>Nagai, Y., C. M. Lapiere, and J. Gross Biochemistry <u>5</u>, No. 10, 3123-3130 (October 1966)</p> <p>A collagenolytic enzyme was prepared from a medium of tissue cultures of tadpole tail fin and back skin. The enzyme was concentrated 300-fold by sequential precipitation of ammonium sulfate, gel filtration, starch block electrophoresis, and DEAE (diethylaminoethyl)-cellulose chromatography. Although caseinolytic activity was considerably reduced, it was still present at low levels in the final product.</p> <p>The yield of enzyme from the tissues of thyroxine-stimulated tadpoles was the same as that from untreated tadpoles. Very little enzyme activity was produced by the skin of mature frogs.</p> <p>The purified enzyme attacked native calf skin collagen in solution at pH 7.6 and reduced the viscosity 40-50 percent at 20° and 75 percent at 27°. The enzyme prevented reconstitution of fibrils in the reaction mixture.</p> <p>Two quantitative assay systems were used, one based on the inhibition of fibril formation from collagen solution, and the other dependent on the release of soluble [¹⁴C]glycine-containing peptides from reconstituted collagen fibrils.</p> <p>*Items on back of card. (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 15 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> | <p>9.13</p> <p>DIGESTION OF FAT BY COD</p> <p>Brockerhoff, H. (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia) Journal of the Fisheries Research Board of Canada <u>23</u>, No. 12, 1835-1839 (December 1966)</p> <p>The digestion of fat by cod was studied in vivo to see if triglycerides are digested the same way in teleosts as in skates and in mammals. After a fatty meal, the gut contents of cod (<i>Gadus morhua</i>) were investigated to determine the composition of the lipids; then the cod were fed a doubly labeled triglyceride to determine if the degradation of fat is stereospecific or not.</p> <p>Results of the content analysis of lipid mixture showed ten times more α, β-diglyceride than α, α'-diglyceride, and five to ten times more β-monoglyceride than α-monoglyceride. It was concluded that the triglycerides were digested by an enzyme, which preferentially attacked the α-ester bonds in the same way as the pancreatic lipases of skates and mammals.</p> <p>The triglyceride contained oleic acid labeled with tritium (H-3) in Position 1, oleic acid labeled with carbon-14 (C-14) in Position 2, and unlabeled oleic acid in Position 3. The ratio of H-3/C-14 radioactivities was 1.23. Stereospecific removal of fatty acid in Position 3 would lead to a diglyceride with the same ratio of activities; removal of oleic acid in Position 1 would yield a (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 15 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: E. R. Weissman</p> |
| <p>8.59</p> <p>PANCREATIC ENZYMES OF THE SPINY PACIFIC DOGFISH. II - PROCARBOXYPEPTIDASE B AND CARBOXYPEPTIDASE B</p> <p>Prahl, James W., and Hans Neurath (Department of Biochemistry, University of Washington, Seattle) Biochemistry <u>5</u>, No. 12, 4137-4145 (December 1966)</p> <p>In the first paper of this series, Prahl and Neurath (1966) reported that the pancreas of the spiny Pacific dogfish (<i>Squalus acanthias</i>) contained zymogens of proteolytic enzymes that were analogous to those found in cows. One of these zymogens, cationic chymotrypsinogen, has been isolated, purified, and characterized by chemical and enzymatic procedures. The anionic pancreatic enzymes of the dogfish, particularly procarboxypeptidase B and the product of its activation, carboxypeptidase B, were chosen for the present study because they can be easily isolated in pure form and because they lend themselves to a detailed comparison with analogous proteins from cow and pig pancreases. This investigation led to the isolation of procarboxypeptidase B and its chemical characterization and activation, and to a report on certain molecular properties of the product of activation, carboxypeptidase B.</p> <p>The purified procarboxypeptidase B obtained after four chromatographies was subjected to the following molecular characterizations: (1) Sedimentation analysis at 4°-6° in 0.1 M Tris-HCl buffer, pH 8.0, containing 0.1 M NaCl showed the presence of a single symmetrical boundary. The molecular weight of the zymogen (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 15 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: M. F. Tripple</p> | <p>9.14</p> <p>EFFECT OF STARVATION AND REFEEDING ON SOME LIVER AND BLOOD CONSTITUENTS OF ATLANTIC COD (<i>GADUS MORHUA</i> L.)</p> <p>Kamra, S. K. (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia) Journal of the Fisheries Research Board of Canada <u>23</u>, No. 7, 975-982 (July 1966)</p> <p>The liver synthesizes plasma proteins and glycogen from dietary constituents. During periods of starvation, the mammalian liver converts the stored glycogen to glucose so that normal levels of blood glucose can be maintained. Although the Atlantic cod (<i>Gadus morhua</i> L.) does not have enough liver glycogen (37±7 mg./100 g. liver) to sustain the fish when its food supply is inadequate, it can still survive for several weeks by using depot fats to maintain a metabolic pool of carbon substrates. Since the yield of liver oil and the quality of the fillets are governed by the nutritional state of cod at the time they are caught, it is important to establish suitable criteria for determining whether the condition of the cod is normal.</p> <p>Twenty-seven cod were held in filtered, aerated, recirculating sea water that was kept at 6.5±0.5° C. They were investigated in three stages--after normal and saturation feeding, after fasting, and after resumed feeding. Following each stage, at least five of the cod were killed and their livers removed and frozen; blood samples were taken from the surviving fish. Hematocrit (percent packed (over)</p> <p>COMMERCIAL FISHERIES ABSTRACTS VOL. 20 NO. 8 PAGE 15 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE.</p> <p>ABSTRACTER: L. Baldwin</p> |

was estimated by sedimentation equilibrium analysis to be 44,000-45,000 at intermediate concentrations. (2) An absorbancy index of 19.0 ± 0.2 was determined by relating the absorbance at 280 mμ to zymogen concentration as measured under the area of a schlieren pattern obtained in the ultracentrifuge. (3) Moving-boundary electrophoresis showed that more than 95 percent of the protein remained under a single peak. (4) Amino-acid analysis was done on the hydrolyzates of a stock solution of the purified zymogen, using norleucine as internal standard. The data are presented in a table. After correcting for 96 percent recovery of total protein and using the nearest integral number of amino-acid residues, the authors calculated that the molecular weight was 44,406. (5) End-group analysis of the amino-terminal residue of the zymogen was done by reaction with fluoro-2,4-dinitrobenzene. The nature of the amino-terminal residue of procarboxypeptidase B was confirmed as phenylthiohydantoin derivative-glutamine.

The characterization of carboxypeptidase B showed an apparent weight-average molecular weight of 35,000-37,000. The results of amino-acid analyses are presented in a table. Composition was expressed on the basis of a molecular weight of 34,000. The enzyme contains one more tyrosine residue than the zymogen. End-group analysis showed dinitrophenyl (DNP)-serine and traces of DNP-glycine, alanine, glutamic acid or aspartic acids.

The enzyme resembles cow and pig carboxypeptidase B in amino-acid composition. Like the dogfish carboxypeptidase B also hydrolyzes substrates for carboxypeptidase B. [23 references]

The purified enzyme had a pI optimum between 8 and 9. It was reversibly inhibited by low concentrations of ethylenediaminetetraacetate (EDTA) and irreversibly inactivated by heating to 60° or by low concentrations of cysteine. It was not affected by diisopropyl fluorophosphate (DFP). The small amount of caseinolytic activity remaining associated with purified collagenase showed the same responses to EDTA, cysteine, and DFP. [20 references]

Chemical Abstracts 64, 20080d (June 20, 1966)

Merrione, Robert M., Armando G. Neves, and Joseph S. Fruton (Yale Univ., New Haven, Connecticut)

PURIFICATION AND PROPERTIES OF DIPEPTIDYL TRANSFERASE (CATHERP SIN C)

8.59

FREE PROPIONIC ACID IN THE SKELETAL MUSCLE OF ELASMOBRANCHS

Velankar, N. K. (Central Inst. Fisheries Educ., Bombay, India)
Chemical Abstracts 64, 1068f (January 3, 1966)

erythrocyte volume), plasma pH, plasma proteins, liver glycogen, plasma glucose, body weight, and liver weight were recorded at each stage so that the changes, if any, could be determined.

Following starvation, the fish lost body weight, liver weight, and liver glycogen. The loss in liver weight was most spectacular, being 50 percent in 4 weeks. When feeding was resumed, the loss was made up within 2 weeks. Liver glycogen increased severalfold (to 702 ± 188 mg./100 g. liver) during the time that the liver was regenerating; however, the increase was only temporary. Hematocrit (normally 23.2 ± 1.2 percent v/v) decreased during the first stages of starvation and then increased slightly as malnutrition increased. Plasma pH rose from 7.24 to 7.54 during starvation, but rapidly returned to normal during regeneration. Plasma protein (normally 4.66 ± 0.36 w/v) and plasma glucose (normally 100 ± 4 mg./100 ml. plasma) decreased during fasting but increased immediately after feeding was resumed.

The use of these findings as measures of the nutritional status of cod is unsatisfactory for two reasons: (1) the normal range of distribution of the factors is wide and (2) prolonged starvation apparently causes the trend set during initial underfeeding to reverse. [10 references]

diglyceride with C-14-radioactivity only. Nonstereospecific lipolysis in Position 1, as well as in Position 3, would lead to a mixture of diglycerides and the ratio of H-3/C-14 should be 50 percent of that of the starting material, or 0.62.

The diglyceride from the gut of one cod had a H-3/C-14 ratio of 0.64 or 52 percent of that of the triglyceride. A second cod had a ratio of 0.69 or 56 percent of the starting ratio.

The author concludes that the digestive breakdown of triglycerides is non-stereospecific in cod, just as in skate and in mammals.

Because of the nature of the in vivo experiments, it was impossible to make quantitative conclusions concerning the digestion of fat in cod. Subjects for future study are the effects of size and nutritional state of the fish, effects of quantity and quality of the meal, and of temperature on the course of digestion; the course of digestion in time; and the determination of pH and other requirements of digestion.

In addition, the source of the "pancreatic lipase" of teleosts has yet to be discovered. The author did not find any activity in the residue left after the extraction of the gut contents. He believes that this may indicate that the lipase of teleosts may be active under conditions other than those suitable for the pancreatic lipases of mammals and skates. [9 references]

0.7
(*)
SOME STUDIES IN ESSENTIAL FATTY ACID METABOLISM
AND NUTRITION

Holman, Ralph T.
Proceedings of the Symposium at the Dedication of Burnside's Laboratory
Annual Report of the Hormel Institute, 1963-1964, p. 37 (University of Minnesota,
Minneapolis)

The relation between dietary intake of polyunsaturated acids and the content
of the metabolites in tissue lipids is described by exponential curves. These
relations lead to the determination of the dietary requirement of essential fatty
acids. Equations relating these functions are used to estimate dietary intake of
linoleate from the analysis of polyunsaturated fatty acids in tissue lipids. The
exponential curves reveal the inhibition of the metabolism of one family of poly-
unsaturates by an increased dietary intake of another family.

[Abstracter: L. Baldwin]

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0.7
Pelfer, J. J.
Sixth International Congress of Biochemistry Symposium, Abstract VII-117, p. 590 (1964)
Annual Report of the Hormel Institute, 1963-1964, p. 34 (University of Minnesota,
Minneapolis)

HYPERCHOLESTEREMIA CHANGED BY SPECIFIC TYPES
OF UNSATURATED FATTY ACIDS

SINGLE DECK COMBINATION VESSELS

2.115
(*)

Corlett, E. C. B.
Norwegian Fishing and Maritime News 13, No. 4, 27, 29, 31, 35 (1966)

To take full advantage of the potential of the fishing grounds in a particular
area, the fisherman might wish to combine the fishing methods of purse seining and
stern trawling, particularly if he has a smaller vessel--say, up to 120 feet over-
all. However, merely incorporating features from each type of vessel will not en-
sure that the result is an efficient combination vessel. The author discusses
purse seining and stern trawling and the requirements of each. Then he discusses
combination vessels from the standpoint that the true combination vessel must be
designed from scratch and the required features balanced to make for the optimum
compromise.

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2.15
(*)
COOLING SPRATS IN SALINE SOLUTIONS

Mihajlova, L. G.
Holod. Tehn. 2, 41-44 (1964) (In Russian)
World Fisheries Abstracts 16, No. 3, 37-38 (July-September 1965)

The author points out that cooling fish in sea water and saline solutions at
a temperature below 0° C. has a number of advantages over cooling them in ice:
fish quality is better owing to the acceleration of the cooling process, and mech-
anization is possible.

The optimum temperature range of the saline solution is from -2° to -3° C.,
since at lower temperatures the upper layers of the fish become slightly frozen.

The time for cooling sprats from 20° to 0° C. in a 5-percent solution of
sodium chloride at a temperature of -2° C. and at a circulation velocity of 1.5 m./
min. is shown below.

The salt content of the fish will in-
crease during the cooling process by not
more than 0.3 percent, but it will not af-
fect the quality of the fish.

| Fish thickness mm. | Cooling time min. |
|-----------------------|----------------------|
| 10 | 3.5 |
| 12 | 5 |
| 14 | 7 |

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[Extractor: L. Baldwin]

3.12
(*)
STUDIES ON THE ANTIMICROBIAL EFFECTS
OF N_α-ACYLDIPEPTIDES

Molin, Nils (Göteborg, Sweden)
Abstracts of Gothenburg Dissertations in Science 4, 22 pp. (1965) (Göteborg, Sweden)
SIK-Publication No. 180 (Svenska Institutet för Konserveringsforskning, Göteborg)

Among the findings from a series of investigations on the antimicrobial effec-
tiveness of N_α-palmitoyl-L-lysyl-L-lysine-ethyl ester (R-1) were the following.
R-1 has a strong antimicrobial effect on both gram-negative and gram-positive bac-
teria and on certain yeasts and molds. The fatty acid part of the dipeptide as
well as the amino-acid part is essential to the antimicrobial activity. For opti-
mum effect on gram-negative organisms, the fatty acid part should have a straight
chain length of from 16 to 18 carbon atoms; gram-positive organisms respond
equally to fatty acids with chain lengths of from 14 to 20 carbon atoms. On liv-
ing cells, the activity of the N_α-acyldipeptide is related to its surface-active
properties; on microbial cells, it is more specific than detergents are.

[Abstracter: L. Baldwin]

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3.12
PICKLING OF MACKERELS IN TROPICAL COUNTRIES USING
PROBIONIC ACID AS PRESERVATIVE

Rao, S. V. Suryanarayana, and A. P. Valsan (Central Fisheries Technol. Res. Sta.,
Ernakulam, India)
Chemical Abstracts 65, 12779h (October 10, 1966)

GENERAL NUTRITION AND MEDICINE

FISHING VESSELS

HANDLING FRESH FISH

PRESERVATIVES AND SANITATION

2.115

MODEL TESTS FOR THE INVESTIGATION OF PROPULSION
AND MANOEUVERING PROPERTIES OF STERN TRAWLERS,
WITH A CONVENTIONAL RUDDER AND WITH A NOZZLE RUDDER

Hühnel, G.

Schiffbautechnik 14, pp. 80-87 (1964) (In German)
World Fisheries Abstracts 16, No. 3, 13-14 (July-September 1965)

The performance of a 1/10 scale model stern trawler equipped with a conventional rudder was compared with that of the same trawler fitted with a nozzle rudder. In both arrangements, the same controllable-pitch propeller was used. Several different nozzle rudders, varying in the proportions of their nozzles and stabilizing fins, were also used. Particulars of the trawler, the propeller, the nozzle rudders, body plans, and drawings are included.

Experimental results are presented in both graphic and cursive form. Measurements of transverse force and rudder-head torque for the various arrangements over a wide range of rudder angles, and of the effect of rudder angle on propulsion characteristics are given. Some conclusions are reached on the effect of nozzle-rudder design on maneuvering qualities. The author intends to make further investigations in which nozzle thrust will be measured during propulsion tests, and rudder-headed torque during standard maneuvering tests on an unrestrained model, to obtain information for use in the design of rudder and nozzle-rudder stocks. [Extractor: L. Baldwin]

0.7

ALTERATION OF THE FATTY ACID COMPOSITION OF BRAIN LIPIDS
BY VARYING LEVELS OF DIETARY ESSENTIAL FATTY ACIDS

Mohrhauser, Hans, and Ralph T. Holman
J. Neurochem. 10, 523-530 (1963)

Annual Report of the Hormel Institute, 1962-1963, p. 33 (University of Minnesota, Minneapolis)

Varying amounts of ethyl linoleate, linolenate, and arachidonate, and linoleate and linolenate together were fed to weanling rats on a fat-free diet. The fatty acid composition of the brain lipids was determined by gas-liquid chromatography. Increasing the amounts of dietary linoleate and arachidonate led to increased deposition of arachidonate and docosatetraenoate in brain lipids. Dietary linolenate gave rise to the polyunsaturated fatty acids of the linolenate family. Eicosatrienoic acid appears in brain lipids of rats deficient in essential fatty acids (EFA) and is depressed by all three EFA. Dietary linolenate fed with linoleate inhibits the conversion of linoleate to arachidonate and docosatetraenoate. This effect can be detected in the fatty acid composition of brain lipids. [Abstract: L. Baldwin]

FISHING VESSELS

GENERAL NUTRITION AND MEDICINE

PRESERVATIVES AND SANITATION

HANDLING FRESH FISH

3.12

TETRACYCLINE APPLICATION AND EFFECT IN WHALING

Walker, E. A.

Fishing News International 5, No. 7, 33-34 (July 1966)

Although the overall contribution of the whaling industry to the world's food supply is small, it is important because of the high nutritional value of the edible products. Yet carcasses deteriorate owing to bacterial action, which is facilitated by the whale's long retention of its body temperature post mortem. Spraying between 5 and 20 gallons of water containing from 1,300 to 2,600 p.p.m. of tetracycline into the visceral cavity during routine inflation immediately after slaughter will reduce the spoilage rate and increase the yield.

[Abstract: L. Baldwin]

2.15

AUTOMATED TUNA VESSEL BEING BUILT IN SPAIN

Anonymous

Fish Boat 11, No. 8, 36 (August 1966)

A tuna purse seiner being constructed in Spain is to be equipped with an automated system for loading, freezing, and storing the catch, all in an assembly line operation. The system allows a purse seine filled with tuna to be coupled to an opening in the stern of the vessel below the waterline. An inflowing current created by the ship's two turbine engines draws the fish into the vessel. The water is expelled from the receiving tank through a second opening in the direction of the seine. The force of the outgoing current floats the net and prevents its becoming fouled in the propeller.

Tuna are emptied from the stern compartment into the adjoining freezer tanks amidships by a conveyor belt. The frozen fish are conveyed to a forward storage compartment, which is also equipped with a conveyor belt that unloads the catch.

The vessel's six freezer tanks will have a freezing capacity of 100 tons of tuna per day. The storage compartment has a capacity of 1,000 cubic meters and a temperature of -20° C. [Abstract: M. F. Tripple]

3.4
 POSSIBILITY OF CARCINOGENIC 3,4-BENZOPYRENE
 IN ELECTROSTATICALLY SMOKED FISH
 Petrun, A. S., and B. L. Rubenchik (Ukrain. Sci. Res. Inst. of Nutr., Kiev, U.S.S.R.)
 Chemical Abstracts 64, 20517g (June 20, 1966)

*Items on back of card.

3.2495
 CHANGES IN CHEMICAL COMPONENTS,
 ESPECIALLY IN INOSINIC ACID, OF COLD STORED BONITO
 Sameshima, Munuo (Univ. Kagoshima, Japan)
 Chemical Abstracts 64, 7278c (February 28, 1966)

[Abstracter: L. Baldwin]

[51 references.]

*Items on back of card.

Smoke produced and absorbed in water was analyzed by gas and thin-layer chromatography. The following elements were found: acetic acid, propionic acid, methylpropylketo, methylaminkito, furfural, guaiacol, creosol, and 2,6-dimethoxyphenol. The chromatographs of the smoke solutions gave quantitative indications of the elements required for smokiness. Formaldehyde and diacetyl contents of the smoke solution were determined through photometry. On the basis of the findings, the synthetic smoke solution is being used in technological experiments by the Hungarian Institute for Meat Research.
 [Extr: L. Baldwin]

World Fisheries Abstracts 17, No. 3, 1/41-42 (July-October 1966)
 (In German)
 Zeitschrift für Lebensmittel-Untersuchung und Forschung 129, No. 2, 84-91 (1966)
 Spanyar, P., E. Kevei, and M. Blazovich

ANALYSIS OF SMOKE-SOLUTION BY GAS
 AND THIN LAYER CHROMATOGRAPHY

(*)

ROTATION STERILIZATION OF CANNED MEAT

3.336
 Eisner, M.
 Fleischwirtschaft 45, No. 10, 1193-1194 (1965) (In German)
 Abstracts from Current Scientific and Technical Literature 19, Abstract No. 430,
 p. 84 (February 1966)

The author compares sterilization times and temperatures in a stationary autoclave with those obtained by rotation sterilization in high pressure autoclaves. With the latter method, a higher sterile value in the center of the can, a saving in time for liquid and semiliquid products, improved quality, and better keeping characteristics were obtained.

*Items on back of card.

The transfer of metal into the product from the unprotected surface of cans can be reduced by converting the liquid part of the product into a gel (by addition of gelatin, agar, or pectin) and storing the product at a low temperature. In this way, convection of the liquid part of the food is prevented and interaction of the component parts of the product with the metal of the can is inhibited.

P. 42 (January 1966)

Barmash, A. I., and V. P. Boiko
 Izv. vyssh. ucheb. Zaved. Pishch. Tekh. 48, No. 5, 56-58 (1965) (In Russian)
 Abstracts from Current Scientific and Technical Literature 19, Abstract No. 212,

THE IRON CONTENT OF CANNED FOODS
 AND ITS EFFECT ON FLAVOUR

3.336
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Postmortem changes in the myofibrillar proteins of sea bass, flatfish, yellow-tail, and skipjack were studied. The fish were killed by severance of the spinal cord and a portion of the muscle was immediately taken for the prerigor sample. Other portions of the muscle were kept at temperatures of from 0° to 2° C. for periods varying from a few hours to a few days; these portions were used as the rigor or postrigor samples.

Ultracentrifugal sedimentation of 50,000 x.p.m. extracts at about 50,000 x.p.m. showed that the dominant component in the KCl extracts is actomyosin during the postrigor phase, regardless of fish species, but either actomyosin or myosin during the prerigor and the rigor phases. The pattern revealed by sedimentation at 40,000 x.p.m. showed the so-called gel fraction during the rigor and postrigor phases but not during the prerigor phase. In the presence of adenosine triphosphate, actomyosin gel superprecipitated in all samples regardless of the postmortem stage.
 [51 references.]

*Items on back of card.

POST-MORTEM CHANGE OF FISH MYOSINS
 IV - COMPONENTS AND ACTIVITY OF MYOFIBRILLAR PROTEIN

3.2495
 (*)

Suzuki, Taneko, and Koichi Kanna (Tokai Reg. Fish. Res. Lab., Chuoh-kō, Tokyo, Japan)
 Bulletin of the Japanese Society of Scientific Fisheries 32, 590-599 (July 1966)

*Items on back of card.

Abstracts from Current Scientific and Technical Literature 19, Abstract No. 430,
 p. 84 (February 1966)

The feature most relevant to muscular contraction is the attainment of a peak force requirement at a certain shortening, followed by a reversal to low values with further shortening. This effect appears to be consistent with the sliding filament theory of contraction. The rapid decline in force requirement occurs at a shortening associated with the transition to the delta state and when a copious release of fluid indicates membrane rupture.
 [Abstracter: M. F. Tripple]

Relatively low forces would shear those samples that had shortened (before being heated) by less than about 20 percent; maximum force was required to shear muscles that had shortened by from 35 to 40 percent. In muscles that had shortened by more than 40 percent, the shear force decreased with increased shortening; in muscle that had shortened by from 60 to 65 percent, the force required was about equal to that in the relatively unshortened muscle.

During a study of the cold-shortening phenomenon in beef muscle, strips of sternomandibularis were made to shorten by four different means. Those muscles that were unfrozen were heated in a water bath to 80° C. and the force required to shear the heat-denatured fibers was measured.

Marsh, B. B., and N. G. Leet (Meat Industry Research Institute of New Zealand, Inc., P.O. Box 617, Hamilton, New Zealand)
 Nature 211, No. 5049, 635-636 (August 6, 1966)

RESISTANCE TO SHEARING OF HEAT-DENATURED MUSCLE
 IN RELATION TO SHORTENING

3.239
 (*)

COMPOSITION OF HICKORY SAWDUST SMOKE.
FURANS AND PHENOLS

3.4

Fiddler, Walter, Robert C. Doerr, V. E. Wasserman, and J. M. Saley (Meat Laboratory, Eastern Utilization Research and Development Division, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, Pennsylvania) *Journal of Agriculture and Food Chemistry* 14, No. 6, 659-661 (November-December 1966)

Phenols have been considered primarily responsible for the characteristic aroma and taste of smoked food. Little work has been done to identify individual phenols in wood smoke. One problem has been a failure to carefully control the parameters of wood smoke production. In this study 18 components of hickory wood smoke were separated by gas-liquid chromatography and identified. The smoke concentrate consisted primarily of phenolic and furan derivatives. [19 references]

[Abstract: E. R. Weissman]

Although it is claimed that the smoky aroma of foodstuffs exposed to smoke is due to phenols, volatile components, which may modify the sensory effect of the phenols, are also present. Thirteen volatile constituents of hickory wood smoke were separated by gas-liquid chromatography (GLC) and seven components were identified by both GLC retention time and infrared spectrum. During the study, several of the condensates showed marked changes upon standing. This is the first report on the nature and extent of these chemical changes. [12 references]

[Abstract: E. R. Weissman]

COMPOSITION OF HICKORY SAWDUST SMOKE.
LOW-BOILING CONSTITUENTS

3.336

APPLIANCES FOR TESTING THE TIGHTNESS OF CANS
AND FOR WITHDRAWING GAS FROM CANS
FOR FOOD QUALITY CONTROL PURPOSES

3.337

Doerr, Robert C., A. E. Wasserman, and Walter Fiddler
Journal of Agriculture and Food Chemistry 14, No. 6, 662-665 (November-December 1966)

Ackermann, K. and C. Krug
Arch. Lebensmittelhyg. 17, No. 4, 88-89 (1966) (In German)
Abstracts from Current Scientific and Technical Literature 19, No. 8, Abstract No. 2055, p. 673 August 1966

Two simple, inexpensive appliances are described for routine testing of the tightness of cans and for withdrawing gas from them.

INGREDIENT CUTS HEAT-PROCESS TIME

3.336

Messina, Blase F., and Dale Page
Food Engineering 38, 48-51 (April 1966)

(Abstract of this article appears under 6.34 page 15 - December 1966)

BIOLOGICAL FORMATION OF FORMALDEHYDE IN COD FISH

3.239

Amano, K., and K. Yamada (Tokai Regional Fisheries Res. Lab., Tokyo, Japan)
Chemical Abstracts 64, 16531b (May 23, 1966)

ON PROTEINS OF FREEZE-DRIED FISH MUSCLE
ON PROTEINS OF FREEZE-DRIED FISH MUSCLE

632.3

Ueoka, Yasunoba, Hiroyasu Oka, and Hidenichi Suemitsu (Collective Chem. Eng. Guid-

ing Sta. Ehime, Matsuyama, Japan)
Chemical Abstracts 64, 16531b (May 23, 1966)

Gould, Edith (Bur. of Com. Fish. Technol., Gloucester, Massachusetts)
Chemical Abstracts 64, 16531b (May 23, 1966)

THE BEHAVIOR OF SOME ENDOGENOUS ENZYME SYSTEMS
IN FROZEN-STORED FISH FLESH

632.3

THE CHANGES OF FISH PROTEINS DURING FREEZING
AND THEIR INHIBITION BY PHOSPHATES.

RESEARCH OF THE REACTION MECHANISM WITH TRACER TECHNIQUES

Kuusi, Taina, Olavi E. Nikkila, and Ritta Kytoakangas
Chemical Abstracts 64, 20525a (June 20, 1966)

CHANGES IN THE HISTIDINE AND HISTAMINE CONTENTS
IN MUSCLE TISSUE IN THE TENCH (TINGA TINCA L.)
AND BREAM (ABRAMIS BRAMA)

5642.3

Dabrowski, Teofil, and Ludmila Stodolnik (Fishery Dept., Wyższa Szkoła Rolnicza, Olsztyn, Poland)
Chemical Abstracts 65, 12633f (July 4, 1966)

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| 4.21 (*) | IDENTIFICATION OF METHYL OCTANOATE DERIVATIVES FROM AUTOXIDIZED METHYL LINOLEATE BY MASS SPECTROMETRY, NUCLEAR MAGNETIC RESONANCE AND INFRA-RED SPECTROSCOPY Horvat, R. J., W. H. McFadden, H. Ng, R. E. Lundin, W. G. Lane, A. D. Shepherd (Western Utilization Research and Development Division, U.S. Department of Agriculture, Albany, California) Nature <u>211</u> , No. 5046, 298-299 (July 16, 1966) Three related compounds--methyl octanoate, 8-formyl methyl octanoate, and 8-formoxy-methyl octanoate (formate of 8-hydroxy methyl octanoate)--were iso- lated and identified from autoxidized methyl linoleate. The conclusion is that the formate was formed from 8-hydroxy methyl octanoate and a hydroperoxide. [10 references.] [Abstract: L. Baldwin] *Items on back of card. | 6.34 (*) | PATHWAY OF ALGINIC ACID SYNTHESIS IN THE MARINE BROWN ALGA, <u>FUCUS GARDNERI</u> SILVA Lin, Tsau-Yen, and W. Z. Hassid (Department of Biochemistry, University of Cali- fornia, Berkeley) Journal of Biological Chemistry <u>241</u> , No. 21, 5284-5297 (November 10, 1966) Discs of the marine brown alga, <u>Fucus gardneri</u> , were infiltrated with uni- formly labeled D-mannose- ¹⁴ C or D-glucose- ¹⁴ C. Radioactivity was detected in the respiratory CO ₂ , the fucoidin, the alginic acid, and the residual fractions, in the ethanol, and in the acid extracts of the leaves. The acid extracts con- tained sugar phosphates, sugar nucleotides, and glyconic acids. Alga containing the following enzymic activities were used to obtain enzyme preparations: hexokinase, phosphomannomutase, D-mannose, 1-phosphate guanylyl- transferase, guanosine diphosphate-D-mannose dehydrogenase, and mannuronic acid transferase. Starting with D-mannose, these enzyme systems are involved in the pathway leading to the formation of guanosine diphosphate-D-mannuronic acid and the subsequent incorporation of the D-mannuronic acid into a polymer of the uronic acid. Enzyme activities of <u>F. gardneri</u> could only be observed when the cell-free preparations were made in the presence of polyvinylpyrrolidone. [36 references.] [Abstract: M. F. Tripple] *Items on back of card. |
| 7.49 (*) | SIMULTANEOUS DETERMINATION OF ⁶² Zn AND ¹⁵ P IN SHELLFISH BY RADIOCHEMICAL TECHNIQUES Setser, J. L., and T. C. Rozzell Journal of the Science of Food and Agriculture <u>17</u> , No. 5, 1-258 (May 1966) A rapid and less expensive procedure for the simultaneous determination of ³⁰ Zn ⁶² and ¹⁵ P ³² than the usual "matrix" and "spectrum-stripping" methods is de- scribed. The flesh of the shellfish is wet ashed with concentrated HNO ₃ + H ₂ O ₂ . The ³⁰ Zn ⁶² is then quantitatively separated from ¹⁵ P ³² on a short resin column and eluted with n-HNO ₃ . The Zn in the eluate is selectively precipitated with NH ₄ SON- HgCl ₂ at -3°. The P in the phosphorus fractions is selectively precipitated and purified by precipitation, first as molybdo-phosphate and then as MgNH ₄ phosphate. A γ-count of Zn ⁶² and a β-count of P ³² are made. The results obtained with crab- clam, and oyster-flesh agreed with results obtained by two separate matrix methods. About six samples may be handled simultaneously. *Item on back of card. | 7.49 (*) | PRODUCTION OF HIGH OSMOLAR CONCENTRATIONS Kuhn, Werner (Univ. Basel, Switz.) Chemical Abstracts <u>62</u> , 15125g (June 7, 1965) |
| 6.32 (*) | OCCURRENCE OF ODD-NUMBERED FATTY ACIDS IN THE MULLET, <u>MUGIL CEPHALUS</u> Ackman, R. G. Nature <u>208</u> , 1213-1214 (December 16, 1965) (Abstract of this article appears under 9.13 page 19 - December 1966) [Abstract: L. Baldwin] *Items on back of card. | 6.32 (*) | CHEMICAL ANALYSIS MARINE PLANT PRODUCTS MARINE PLANT PRODUCTS |
| 4.21 (*) | COMPARATIVE BIOCHEMISTRY OF CAROTENOIDS IN ALGAE. <u>II - ON CAROTENOIDS IN CODIUM INTRICATUM</u> AND THEIR BIOSYNTHESIS Katayama, Teruhisa Bulletin of the Japanese Society of Scientific Fisheries <u>32</u> , 610-620 (July 1966) The author confirmed that the carotenoids in <u>Codium intricatum</u> are composed of α-carotene, β-carotene, siphonaxanthin, neoxanthin, lutein, zeaxan- thin, tataxanthin, a prolycopenelike compound, a phytofluene-like compound, and a phytoenelike compound. To study the biosynthesis of the carotenoids, he in- jected 2-C- ¹⁴ -mevalonic acid into the alga, incubated it for 48 hrs. in sea water, extracted the carotenoids, separated the xanthophyll fraction from the carotene fraction by partition coefficient, and subjected each fraction to thin-layer chromatography. The results showed that the 2-C- ¹⁴ -mevalonic acid had been in- corporated into the siphonaxanthin, the neoxanthin, the phytoenelike compound, and the phytofluene-like compound. He assumed, therefore, that the carotenoids in <u>Codium intricatum</u> are synthesized in about the same way those in land plants are. [62 references.] *Items on back of card. | 4.21 (*) | INORGANIC ANALYSIS MARINE PLANT PRODUCTS |

7.49 DETERMINATION OF STRONTIUM-90 IN SEAWATER AFTER CONCENTRATION BY MANGANESE DIOXIDE

Shipman, William H. (U.S. Naval Radiological Laboratory, San Francisco, California 94135) Analytical Chemistry 38, No. 9, 1175-1177 (August 1966)

In an analysis of strontium 90 (Sr90) in sea water, the adsorption of Sr by hydrous manganese dioxide was used to concentrate the Sr. The complete radiochemical procedure, using the manganese dioxide concentration as a first step, is described. The chemical recovery is simplified by the use of Sr85, which can be gamma counted after the Y90 is milked and beta counted in a low background counter. This procedure gives a good chemical recovery, satisfactory decontamination from other isotopes, and a low reagent blank. The procedure has been applied to a large number of analyses of Sr90 in sea water with satisfactory results. [6 references.] [Abstracter: M. F. Tripple]

9.32 ISOLATION AND PURIFICATION OF FUCOIDIN FROM BROWN SEAWEED, PELVETIA WRIGHTII

Anno, Kimiko, Hisako Terabata, Yutsuki Hayashi, and Nobuko Seno (Department of Chemistry and Research Institute of Food Chemistry, Ochanomizu University, Tokyo, Japan) Agricultural and Biological Chemistry 30, No. 5, 495-499 (May 1966)

A highly purified fucoidin was isolated from the brown seaweed Pelvetia wrightii by an improved method that involves the removal of alginates with a calcium-chloride solution and purification with cetylpyridinium chloride. The critical salt concentrations of the cetylpyridinium complex of alginic acid and fucoidin in salt solutions (KCl, NaCl, and CaCl2) were measured to determine optimum conditions for separating and purifying fucoidin. The fucoidin of the brown seaweed contained both fucose and galactose in a ratio of about 10:1. The fucoidin was considered to be a galactofucan sulfate. [14 references.] [Abstracter: M. F. Tripple]

6.32 ENOLASE ACTIVITY IN MARINE PLANKTONIC ALGAE

Antia, N. J., J. Kalmakoff, and A. Watt Canadian Journal of Biochemistry 44, 449-454 (April 1966)

(Abstract of this article appears under 7.591 page 17 - September 1966)

12.4 AUTOXIDATION OF UNSATURATED FATTY ACIDS ESTERS IN PRESENCE OF METHANOL AND PROTONS. II THE AUTOXIDATION OF METHYL LINOLEATE

Schöllner, R., and R. Herzschuh (Institute for Organic Chemistry, Karl Marx University, Leipzig, Germany) Fette-Seifen-Anstrichmittel 68, No. 8, 229-236 (August 1966)

Seven possible isomeric hydroperoxides are formed by the autoxidation of methyl linoleate in the presence of methanol and protons. The amounts of the hydroperoxides formed were determined by quantitative estimation of the 4,4'-dinitrophenylhydrazones of the saturated and unsaturated aldehydes and aldehyde esters contained in the cleavage products. The 2,2'-ethylenedinitrophenylhydrazones were quantitatively separated from the osazones by paper, partition, and thin layer chromatography. Of the hydroperoxides formed, 0.7 percent were derived from the conjugated fatty acids. The C-H-C bonds of the 8th C-atom were less reactive towards oxygen than were those of the 4th C-atom. The α -methylene group of the shorter alkyl rest was preferentially autoxidized. [11 references.] [Abstracter: M. F. Tripple]

4.21 CONTROL OF FAT OXIDATION BY CONTROL OF OXYGEN

Marcuse, Reinhard (Swed. Inst. Food Preservation Res., Göteborg, Sweden) Chemical Abstracts 64, 14872c (May 9, 1966)

6.34 FOOD MODIFYING AGENT FROM THE SEA

Teplitzky, D. R. Aust. J. Mar. Sci. 35, No. 2, 17-18, 20, 22, 24 (1965) Abstracts from Current Scientific and Technical Literature 19, Abstract No. 426, p. 83 (February 1966)

The origin, chemistry, preparation, properties, and uses of sodium alginate are discussed.

43.9 EXTRACTION OF ALGINIC ACID AND ALGINATES FROM BROWN SEAWEEDS

Rao, V. A. Visweswara, and L. C. Mody Indian J. Technol. 3, No. 8, 261-262 (1965) Abstracts from Current Scientific and Technical Literature 18, Abstract No. 3160, p. 695 (December 1965)

When alginic acid was extracted from brown seaweeds by the intermediate formation of sodium or calcium alginate, the latter gave a superior alginic acid.

7.51
(*)
A GENERAL ASSAY METHOD FOR NUCLEOTIDE PYROPHOSPHORYLASES
Nagano, Yuji, Hirotooshi Samejima, and Shukuo Kinoshita (Tokyo Research Laboratory, Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan)
Agricultural and Biological Chemistry 30, No. 4, 359-363 (April 1966)

A general assay method for nucleotide pyrophosphorylases was studied. This method is based on the measurement of the consumption rate of 5-phosphoribosylpyrophosphate (PRPP) during the enzyme reaction.

An enzyme preparation was incubated for 50 min. in a reaction mixture containing a purine or pyrimidine base and PRPP. The amounts of PRPP present before and after the reaction were determined by an enzymatic method in which orotidine-5'-monophosphate (5'-OMP) pyrophosphorylase and 5'-OMP decarboxylase were used. The nucleotide pyrophosphorylase activity corresponding to each purine or pyrimidine base was determined from the amount of PRPP consumed per unit of time (0-50 min.).

The method is considered applicable to the determination of activities of any kind of nucleotide pyrophosphorylases; moreover, it does not require any tedious separation procedure. In comparison with conventional assay methods for nucleotide pyrophosphorylase activities, this method is much simpler and more reliable. The activities of several nucleotide pyrophosphorylases in *Micrococcus glutamicus* were also determined with the method.
[Abstract: M. F. Tripple]

*Items on back of card.

8.51
(*)
ABSORPTION SPECTRA OF SPERM WHALE FERRIMYOGLOBIN
Hanania, George I. H., Arpi Yeghiayan, and Bruce F. Cameron (Department of Chemistry, American University of Beirut, Lebanon)
Biochemical Journal 98, No. 1, 189-192 (January 1966)

Absorption spectra show that sperm whale ferrimyoglobin contains 0.308 percent Fe on a dry weight basis; this corresponds to a molecular weight of 18,130. After the solid takes up moisture to an equilibrium state, it contains 0.280 percent Fe.

Absorption spectra are given for acidic ferrimyoglobin, $\text{Fe}^+(\text{H}_2\text{O})$, and for its conjugate base, Fe-OH . Spectra within the range of 200-2,500 m μ are also given for the fluoride and cyanide complexes. In addition, data for ferromyoglobin-carbon monoxide, Fe(II)-CO , in the visible range are presented. Minor spectral differences between whale and horse myoglobins, particularly in the effect of temperature on the visible-absorption spectrum of Fe-OH , are described.
[Abstract: M. F. Tripple]

*Items on back of card.

8.51
FREE AMINO ACIDS IN THE BILE OF SOME CYPRINIDS
Creach, Y. (Fac. Sci., Toulouse, France)
Chemical Abstracts 63, 3365b (August 2, 1965)

ORGANIC ANALYSIS

ORGANIC COMPOSITION

8.59
(*)
STERO-BILE ACIDS AND BILE ALCOHOLS.
82. COMPARATIVE STUDIES ON THE BILE SALTS OF FISHES
BY THIN LAYER CHROMATOGRAPHY

Sasaki, Takeshi (Department of Biochemistry, Hiroshima University School of Medicine, Hiroshima, Japan)
Journal of Biochemistry 60, No. 1, 56-62 (July 1966)

The bile salts from 30 species of fishes were examined by thin-layer chromatography. The following results were obtained. The bile salts of Elasmobranchii consisted mostly of scymmol sulfate; however, they also contained taurocholate and chimaerol sulfate as minor constituents. A small amount of cholic acid, allocholic acid, and an unknown bile acid with the same chromatographic behavior as dihydroxycholic acid were present in the bile from the members of the Cyprinidae family. The chief bile salt from this family of fishes was 5 α -cyprinol sulfate. The main bile constituent of *Misgurnus anguillicaudatus* was 5 α -cyprinol sulfate. A small amount of trihydroxycholic acid conjugated with taurine was also present. *Parasilurus asotus* bile contained 5 α -cyprinol sulfate as a minor constituent. Taurocholate and taurochenodeoxycholate were also found. *Oncorhynchus rhodurus* bile contained 3-keto-7 α , 12 α -dihydroxycholic acid, and cholic acid. In two species of the class Anguillida and in *Conger myriaster*, 5 β -cyprinol sulfate was a minor bile component. Haemulcholic acid, a new bile acid, was isolated from the bile of *Parapristipoma trilineatum*.
[17 references.]
[Abstract: M. F. Tripple]

*Items on back of card.

9.13
(*)
SEDIMENTATION AND ACTINOMYCIN D BINDING STUDIES
OF PARTIALLY DENATURED CRAB DAT

Widholm, Jack M., and James Bonner
Biochemistry 5, No. 5, 1753-1759 (May 1966)

Sedimentation analysis and actinomycin D inhibition of ribonucleic acid (RNA) synthesis were used to show that poly DAT (alternating deoxyadenylate-deoxythymidylate copolymer) of *Cancer antennarius* that had been heated and cooled was partially denatured. The once-melted DAT sedimented more rapidly than the truly native DAT did. Actinomycin inhibited RNA synthesis by *Escherichia coli* RNA polymerase less with the once-melted DAT template than it did with native DAT. The poly DAT component of *Cancer borealis* deoxyribonucleic acid (DNA) was separated by the mercury-binding method. This DAT contained 2.5 percent guanine plus cytosine, as compared to 3.5 percent for *C. antennarius* DAT. The *C. borealis* DAT behaved in a manner similar to that of *C. antennarius* DAT.

When melted and cooled, the *C. antennarius* DAT had a lower temperature at midpoint, and it melted over a wider temperature range than did unmelted *C. borealis* DAT. The CsCl buoyancy density of *C. antennarius* DAT was slightly increased, and the actinomycin inhibition of RNA synthesis with the DAT template was lessened. The differences between the melted and unmelted forms were less for the *C. borealis* DAT than for *C. antennarius* DAT, probably because the former DAT had a lower guanine-cytosine content. [16 references.]
[Abstract: M. F. Tripple]

*Items on back of card.

ORGANIC COMPOSITION

BIOCHEMISTRY AND METABOLISM OF FISH

8.59 COMPARATIVE BIOCHEMISTRY OF BILE SALTS

Haselwood, G. A. D. (Guy's Hosp. Med. School, London, England)
Chemical Abstracts 64, 14645a (May 9, 1966)

[Abstracter: M. F. Tripple]

The carbon monoxide Bohr effect of hemoglobin from tuna (*Thunnus thynnus*) was studied through the application of differential titrations. The results were studied by the model usually applied to mammalian hemoglobins. This model assumes the presence of two ligand-linked acid groups, one for the acid and one for the alkaline part of the effect. The values of ΔpK were larger than those usually found in mammalian hemoglobins. The mean pK values for the two groups were consistent with the concept that the two linked acid groups are a carboxyl in the acid range and an imidazole or an α -amino in the alkaline range.

Brunori, Maurizio (Institute of Biochemistry, University of Rome, Rome, Italy) (Archives of Biochemistry and Biophysics 114, No. 1, 1966)

65.8 THE CARBON MONOXIDE BOHR EFFECT IN HEMOGLOBIN FROM *THUNNUS THYNNUS*

9.13 PRINCIPAL DIGESTIVE ENZYMES AND THE THERMAL RESISTANCE OF SOME BLACK SEA FISH

Kandiyuk, R. P.
Chemical Abstracts 63, 8781b (September 27, 1965)

9.13 THE EFFECTS OF SEASON, TEMPERATURE, AND SALINITY ON STANDARD AND ACTIVE OXYGEN CONSUMPTION OF THE GRASS SHRIMP, *PALAEMONETES VULGARIS*

McFarland, W. N., and P. E. Pickets (Cornell Univ., Ithaca, New York)
Chemical Abstracts 63, 7401c (September 13, 1965)

(September 13, 1965)
Pequignot, J. (Univ. Toulouse, France)
Chemical Abstracts 63, 10476 (September 13, 1965)

9.13 TISSUE RESPIRATION IN FISH: OPTIMAL CONDITIONS OF A POTENTIAL RESPIRATION IN TISSUE HOMOGENATES

61.6 EFFECT OF STEROID HORMONES ON THE SYNTHESIS OF PROTEIN AND NUCLEIC ACIDS IN FISH OVARY

(September 13, 1965)
Chang, Shih-Yung, Hsiao-Chou Shen, and Chien-Wai Liu
Chemical Abstracts 63, 7400b (September 13, 1965)

7.51

EXPERIMENTAL STUDY OF LIPEMIA CLEARING BY LIPOPROTEIN LIPASE AND ALTERED BLOOD COAGULABILITY WITH RESPECT TO FATTY ACID COMPOSITION OF DIETARY TRIGLYCERIDES

Chakravarti, R. N. (Inst. Post-Graduate Med. Educ. Res., Chandigarh, India)
Chemical Abstracts 63, 18729b (December 20, 1965)

[Abstracter: M. F. Tripple]

The electrophoresis of proteins, including enzymes, was conducted in a gel medium across which a continuous pH gradient extended transverse to the direction of protein migration. Any splitting of a resultant trace for the change of protein mobility with pH would suggest both protein heterogeneity and pH conditions for further purification and subfractionation.

Dubbs, Clyde A. (St. John's Hospital Research Foundation, Santa Monica, California) (Science 151, No. 3709, 1966)

15.7 PROTEIN HOMOGENEITY TEST AND SUBFRACTIONATION TECHNIQUE

8.51 CYTOPLASMIC BASIC PROTEINS IN THE OOCYTES OF THREE SPECIES OF MOLLUSKS

Davenport, R., and Janice C. Davenport (Univ. of Illinois, Urbana, Illinois)
Chemical Abstracts 64, 1072a (January 3, 1966)

[Abstracter: L. Baldwin]

The conchiolin of any given species appeared to have a specific amino-acid pattern; the pattern varied considerably, however, between mineralized and non-mineralized layers of the same shell. Food habits and environment did not seem to alter the pattern characteristic of any given group.

The usual form of automatic amino-acid analysis.

The amino-acid compositions of the proteins from different structural units of two shells of Cephalopoda, three shells of Gastropoda, and five shells of Pelecypoda were compared. The conchiolin matrix was taken from the decalcified shell, put in a glass tube containing 2 ml. of a 6N hydrochloric-acid solution, sealed, and then hydrolyzed for 22 hours at 110°C. The hydrolyzate was then subjected to the usual form of automatic amino-acid analysis.

15.8 TAXONOMIC MODIFICATION OF AMINO ACID COMPOSITION IN THE PROTEINS OF MOLLUSCAN SHELLS

(March 1966)
Wada, K. (National Pearl Research Laboratory, Mie, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 32, 253-259

2.1115 NET REPAIR MANUAL

Gebhardt, S. V. (Fish and Game Department, State of Idaho)
Net Repair Manual 21 pp. illus.
World Fisheries Abstracts 16, No. 2, 21 (April-June 1965)

Although most nets are machine-tied and are purchased ready-made, net repair must still be done by hand. Since a properly mended net can mean the difference between catching many fish or none at all, this manual attempts to acquaint the beginner with the proper procedures of mending. Each operation is described in an introductory note and illustrated by sketches. The manual covers trimming, weaving (shuttle and knots), section replacement, hanging (hanging basis; hanging on supporting lines; hanging on hoops), and maintenance of nets (nylon; other synthetics).
[Extractor: L. Baldwin]

[Extractor: L. Baldwin]

Molin.

Despite its higher price, the fishability and the properties of nylon (non-rotting, quick-drying, and lightweight) make it superior to cotton for fresh-water gill nets. Fishing tests made in Swedish lakes by G. Molin and published during 1952 to 1962 show that monofilament nylon nets caught seven times as much fish as similar cotton nets and three times as much as multifilament nylon nets. The present author made comparative investigations in North Swedish lakes during 1962 and 1963. His results show that the fishability of nylon nets is not much better than that of cotton. He suggests that the ability of fish to dodge fishing gear by experience may be the reason for the difference in his findings and those of Molin.

FISHABILITY OF NYLON NETS

2.1112

Runnstrom, H.
Svenska Fiskeri Tidskrift 73, No. 5/6, No. 4, 19 (October-December 1964)
World Fisheries Abstracts 15, No. 4, 19 (October-December 1964)

[Abstractor: E. R. Weissman]

Another small hand-operated unit is adjustable to fit any size oyster or clam and operates by means of a knife blade on an adjustable lever.

A compressed air-operated shucker is claimed to offer the advantage of opening any and every oyster properly presented to it without disturbing the refrigerated temperature of the oyster. The manufacturer claims this will reduce the hazard of contamination and extend shelf life in retail outlets.

A completely automated oyster shucking unit is designed to offer single oysters with a capacity equal to that of five hand shuckers. This machine requires the oysters be wet for successful shucking. The operator positions the oyster on a carrier. A conveyor carries the wet oyster through a heat chamber where the meats are kept floating in the shells by means of a series of cams. This floating action is continued after the oysters emerge from the chamber until the meats are dropped on an inclined plane and washed into a container.

A small hand-operated unit is designed for home use. It is primarily intended to make oyster eaters and party givers competent shuckers, thereby promoting the sale of oysters.

A completely automated oyster shucking unit is designed to open single oysters with a capacity equal to that of five hand shuckers. This machine requires the oysters be wet for successful shucking. The operator positions the oyster on a carrier. A conveyor carries the wet oyster through a heat chamber where the meats are kept floating in the shells by means of a series of cams. This floating action is continued after the oysters emerge from the chamber until the meats are dropped on an inclined plane and washed into a container.

A variety of oyster shuckers is available, ranging from a simple hand-operated model to a \$12,000 completely automated shucker.

Anonymous
Fishing Gazette 83, No. 10, 13, 22 (October 1966)

1.81 LIKE SKINNING A CAT, THERE'S MORE THAN ONE WAY
TO OPEN AN OYSTER

0.8

THERMOPLASTIC PIPING

Pym, R. K.
Australasian Corrosion Engineering 10, No. 4, 3-5 (April 1966)
Australasian Science Index 10, 349 (July 1966)

[Extractor: L. Baldwin]

Melting temperature and the gradual changes of sea-water sliced ice were determined during the melting period. At the same time, the percentage of salt in water melted from the sea ice was analyzed. In view of the amount of salt found in the sea water that is used for making ice, differences from the expected melting point were considerable. The advantages and disadvantages of these differences for icing fish are discussed.

[Extractor: L. Baldwin]

Technical Paper No. 63 presented at General Fisheries Council for the Mediterranean, FAO, Madrid, 1963
World Fisheries Abstracts 16, No. 2, 35 (April-June 1965)

MELTING POINT OF SEA-WATER ICE USED FOR ICING FISH

8.0

0.36

LIPID PEROXIDE IN A PEROXIDASE-TYPE REACTION

O'Brien, P. J. (Department of Medical Biochemistry, Birmingham University, England)
Biochemical Journal 102, No. 1, 9P (January 1967)

Pure linoleic acid hydroperoxide (LAHPO) was prepared according to the method of O'Brien and Frazer (1966). The rate of degradation of its aqueous solutions at pH 8.5 by heme catalysts, studied by measuring the extinction decrease at 232 mμ, was found to be first order with respect to the LAHPO and the catalyst concentrations. For cytochrome c and hemoglobin, the rate was maximal at pH 3.0, being three times that at pH 8.5.
[Abstractor: M. F. Tripple]

[Abstractor: M. F. Tripple]

The authors concluded that the metabolism of linoleic acid hydroperoxide (LAHPO) does not involve direct conversion into linoleic acid but rather a conversion to intermediates, which are metabolized by a mechanism similar to that for an oxidized fatty acid. Thin-layer autoradiographs of decomposition products of LAHPO after incubation with liver homogenate or supernatant fraction suggested a different mechanism of decomposition, since the hydroxy acids, not the polymeric products, are the final products formed.

Freeman, I. P., and P. J. O'Brien (Department of Medical Biochemistry, Birmingham University, England)
Biochemical Journal 102, No. 1, 9P (January 1967)

THE METABOLISM OF A LIPID PEROXIDE

0.36

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| 2.113 | DRILL ATTACHMENT RIPS OFF RUST AND CORROSION | <p>Anonymous Marine Engineering/Log 70, No. 6, 86 (1965) World Fisheries Abstracts 16, No. 3, 1 (July-September 1965)</p> <p>An attachment for a ½-inch drill is now available for removing heavy rust, scale, paint, barnacles, chemicals, and other fouling agents from steel and other hard surfaces. The tool makes use of a universal joint that increases cutting power by absorbing vibration on either flat, round, or rough surfaces. It also has a removable retaining ring so that a worn cutter can be quickly replaced.</p> <p>[Extractor: L. Baldwin]</p> <p>-----</p> <p>2.113 DEVELOPMENT IN ANTI-CORROSION PRIMERS AND RUST PREVENTATIVES</p> <p>Emery, S. N. Australasian Paint Journal 12, No. 2, 21-23 (May 1966) Australian Science Index 10, 345 (July 1966)</p> | 3.25 | THE ROLE OF AIR CONDITIONING AND REFRIGERATION IN THE AIR CARGO INDUSTRY | <p>Overmyer, Ellis J. (Commercial Airplane Div. of Boeing Co., Renton, Washington) ASHRAE Journal 9, No. 2, 51-58 (February 1967)</p> <p>Some major air-cargo terminals have large-capacity refrigerated rooms for prechilling and preserving perishable products. Airlines without this type of facility might consider insulated containers with provisions for a plug-in refrigeration unit. These refrigeration units are used on the ground for precooling or holding and are removed prior to flight; a similar unit is installed at the destination. Records indicate that perishable products preconditioned and placed in these insulated containers can travel by air over fairly long routes.</p> <p>[Abstractor: M. M. Gwin]</p> |
| 2.6712 | CATCHING HAKE WITH A TRAMMEL NET | <p>Anonymous World Fishing 51, No. 6, 38 (June 1966)</p> <p>The sizable catch of high-quality hake caught by an inshore French fisherman raised appreciable interest in his method. In a 48-hour trip aboard a 57-foot former crabber, the fisherman landed a quantity of hake that would have grossed over £300 if landed in Britain. In a total catch that filled about 26 140-lb. baskets, 12 contained sizeable hake of remarkably good quality. The remainder of the catch consisted of 5 baskets of pollock and 9 of good quality mixed fish. All the fish were of good size.</p> <p>Method.--Using 50 trammels, each about 260 feet long and 32 feet deep and supported by floats attached every 16 feet to the top line, the fisherman worked in rocky ground formerly considered suitable only for setting pots. Each trammel was formed of two vertical nets of large mesh separated by a net of small mesh. The fish were caught when they pushed through the outer mesh and created a baglike trap of the smaller net. The trammel was anchored to the sea bottom.</p> <p>Advantages.--One of the trammel's greatest assets is its ability to fish for bottom fish where no trawler would ordinarily be able to set her gear down. Moreover, its large outer meshes will hold small fish, so it automatically promotes conservation. The most impressive thing about the catch to the reporter was the impeccable condition of the fish, which brought a price about ½ cent higher than that brought by fish caught by conventional methods.</p> <p>[Abstractor: L. Baldwin]</p> | 4.10 | ANATOMY OF A TRI-GLYCERIDE | <p>Butler, Charles (Industrial Research, Bureau of Commercial Fisheries, Washington, D.C. 20240) Fishing Gazette 83, 10-11 (February 1966)</p> <p>Because of the large number of different triglycerides in fish-body oils, triglycerides and their nutritive qualities are important in food. This article explains in lay terms the difference in saturated and unsaturated fatty acids and comments on nutritional advantages of fish-derived triglycerides.</p> <p>[Abstractor: L. Baldwin]</p> <p>-----</p> |
| 4.10 | GENERAL INTRODUCTION TO POLYUNSATURATED ACIDS | <p>Holman, Ralph T. (Univ. of Minnesota, Austin) Chemical Abstracts 66, No. 6, 20190c (February 6, 1967)</p> | 4.10 | TRANSPORTATION | |

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